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We Announce

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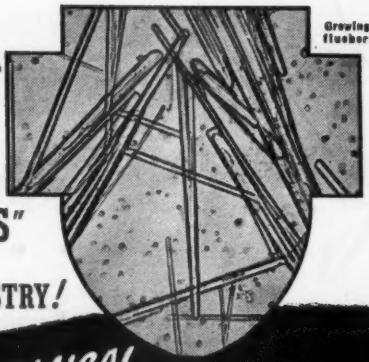
IT is with pleasure that we formally announce the enlarged editorial staff for the *Monthly Review*. Effective in October, Mr. Candee has been assisted by five associate editors, strategically located so they may obtain editorial material in the form of technical articles designed to make the *Review* better than ever.

Listed on the title page of the *Review* are the names of these associate editors—Dr. Charles Faust, Dayton branch; Dr. William Blum, Baltimore-Washington branch; Dr. Richard Saltonstall, Detroit branch; Mr. James P. ApRoberts, Los Angeles branch; Mr. Clarence Helmle, Bridgeport branch. These men are prepared to devote their time and effort in covering technical society meetings and contacting individuals in order to obtain articles of interest to our members. They are deserving of your support, and it is hoped that if you, as a loyal supporter of your society, have any editorial material available, covering processes, results of research developments, and other such material which should be made accessible to the industry which our society represents, you will submit it to them.

The *Monthly Review*, as the official publication of the American Electroplaters Society, should be the finest periodical available on all phases of metal finishing and allied processes. It is inevitable that such a realization must have as its prime consideration the full support of our members. It is through the branch meetings, our conventions, and our publications that this society stands today as the finest means of education in the particular field which it represents. It is the most sincere desire of the executive board to not only maintain but to improve this position.

For this purpose, the associate editors of the *Review* were appointed, and they can function best with your whole-hearted support, which we are sure you, as a member, will give.

WALTER PINNER



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COLORIMETRIC METHODS AS APPLIED TO THE ANALYSIS OF ELECTROPLATING BATHS

D. Gardiner Foulke, Ph. D.

FOREWORD

This article by Dr. Foulke constitutes the first of a series which he will publish dealing with the determination of impurities in plating baths. The effect of small, but at the moment poorly defined, quantities of copper and iron are known to have a pronounced effect on the luster of bright nickel deposits. Small quantities of iron, copper, and lead may be co-deposited with the major metal, but such alloys in general lack the ductility of the pure metal. While the plater's attention has been largely focused on major factors having to do with the properties of electro deposits, it is probable that advanced knowledge of the science will direct his attention shortly to minor, but nevertheless, important considerations. It is therefore considered that the contributions which Dr. Foulke is prepared to make are valuable to this society.

W. L. PINNER, *Educational Chairman*

• •

The Determination of Lead

WITHIN recent years there has been a trend towards the use of colorimetric methods, particularly for the determination of trace elements. With the introduction of relatively inexpensive colorimeters of the electronic tube type, colorimetric methods are being widely adopted because of the saving of time and ease of operation as well as the accuracy attainable. Believing that shortly the photoelectric colorimeter will become standard equipment in the majority of analytical laboratories, the author feels that colorimetric methods developed for the analyses of plating baths will be of interest to platers in general.

Colorimetric methods are not new, almost all analysts having at some time or another made determinations involving colorimetry, such as the determination of copper in ammoniacal solution. However, the introduction of the electronic tube has virtually eliminated the visual and personal errors resulting when colors are compared by the human

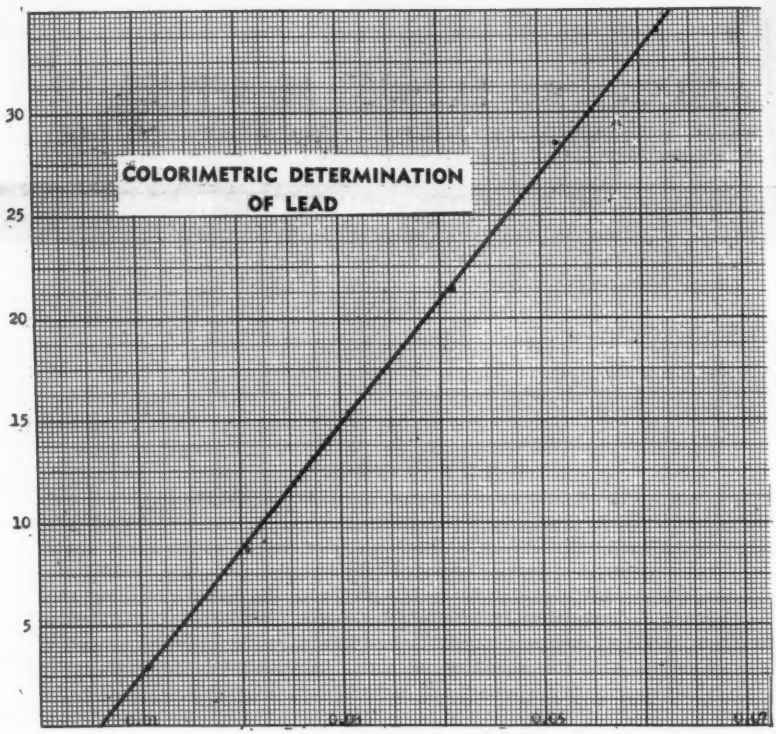

FIGURE I

eye. Basically, the colorimetric method of analysis depends upon the principle that the color intensity of a solution due to the presence of a colored constituent is directly proportional to the concentration of that constituent. In practice this involves measuring the intensity of a given shade of light transmitted by the solution and comparing this with the transmittance of a standard solution of approximately the same refractive index.

The procedures to be described in this series of articles were developed to be used in conjunction with a Fisher Electrophotometer. Consequently, the operations involved in determining lead colorimetrically will be described with respect to the above instrument. However, essentially the same procedure is followed for all the simpler instruments on the market.

The essential parts of the electrophotometer as far as the operator is concerned are: a carriage carrying two glass absorption cells, a filter to provide light of the proper wave length, a galvanometer adjustment knob, a switch for adjusting the instrument with respect to the standard solution, and a combination of on-off switch and light intensity control.

After inserting the proper filter, 425 B or blue filter for lead, in the instrument and adjusting the galvanometer to a hair line on the dial, place the two adsorption tubes one containing the solution to be measured and the other containing the blank—the latter being placed to the rear of the carriage. (Specific directions describing the preparation of the lead blank are given below.) The carriage is pulled towards the operator against a stop, then with the dial set at 100% transmission the null switch is adjusted until the galvanometer returns to the hair line. The carriage is then pushed away from the operator to a stop and the galvanometer is again adjusted to the hair line by rotating the large dial. The reading on the dial is recorded and the concentration of the constituent is determined by referring to a curve which must be prepared using known amounts of the constituent. Table I gives the values found on one instrument for various known concentrations of lead while the curve resultig from the plotting of this data is shown in Figure I.

TABLE I
Calibration of Electrophotometer

Ml. Std. Lead Solution	*Mg. Std. Lead*	*Log Reading*
.5	0.0103	2.9
1.0	0.0206	8.7
1.5	0.0309	15.4
2.0	0.0412	21.4
2.5	0.0515	28.5
3.0	0.0619	34.0

The specific details of the method for the colorimetric determination of lead are as follows:

1. Pipette an appropriate sample of the plating bath (5 ml. to 20 ml. as indicated by a trial determination) into a 500 ml. separatory funnel. Add 15 ml. of distilled water and 10 ml. of citric acid (500 gm./l.).
2. Make the solution ammoniacal by the addition of 10 ml. of concentrated ammonia (pH should be 9.5-10), and add 20 to 65 ml. of 10% potassium cyanide solution, depending upon whether the sample size was 5 ml. or 20 ml.
   potassium cyanide solution, depending upon whether the sample size was 5 ml. or 20 ml.
3. Add 10 ml. of dithizone solution (2½ mg. diphenylthiocarbazone/50 ml. CCl_4), shake for half a minute and allow to settle.
4. Draw off the CCl_4 layer into a 250 ml. separatory funnel which contains 25 ml. ammonia-cyanide solution (10 ml. 10% to KCN and 5

ml. concentrated NH_4OH made up to 500 ml. with distilled water). Shake and allow to settle.

5. Repeat the above extraction using another 10 ml. volume of dithizone and then draw the carbon tetrachloride layer into the second separatory funnel as before.
6. Draw off the combined carbon tetrachloride extracts from the second separatory funnel into a third funnel containing 50 ml. of the ammonia cyanide solution. Shake and allow to settle.
7. Draw off the carbon tetrachloride layer into a dry 50 ml. volumetric flask and dilute to the mark with carbon tetrachloride. Mix well.
8. A blank is prepared as follows: To a separatory funnel add 20 ml. of distilled water, 10 ml. concentrated ammonium hydroxide, 10 ml. of citric acid, the same amount of KCN as added to the sample. Then repeat the instructions given under 3, 4, 5 and 6.
9. Fill one electrophotometer tube with the carbon tetrachloride from the blank and another with that from the sample.
10. Using the 425 B filter adjust the electrophotometer to zero on the log scale with respect to the blank, then take the reading for the sample.
11. Read the milligrams of lead on the chart which corresponds to the scale reading.
12. Calculations:

$$\text{mg. Pb/l} = \text{mg. Pb. on chart} \times \frac{1000}{\text{ml. sample}}$$

When organic addition agents have been added to the bath either as surface active agents or brightening agents, it is suggested that the sample be fumed for five or ten minutes with 10 ml. of perchloric acid before analysis for lead.

Data showing the results obtainable by this method are given in Table III for various nickel baths of the composition shown in Table II.

TABLE II
Analysis of Nickel Baths

Bath No.	*Ni*	*Cl*	*BO_3*	*S.T.*	*Addition Agents*
1.	2.32 N	.37 N	.60 N	—	No
2.	1.76 N	.15 N	.26 N	73	Yes
3.	2.89 N	.26 N	.55 N	68	Yes

TABLE III
Analysis of Nickel Baths for Lead

Bath No.	Lead Added Mg./L.	Lead Present Mg./L.	Lead Analysis Colorimetric Mg./L.	Lead Analysis Assay Mg./L.
1	0	2	4	2
1	25	27	22	22
2	0	1	2	1
2	25	26	22	21
2	50	51	48	47
3	0	1	1	----
3	25	26	23	24
3	50	51	48	48

The discrepancy between the lead added and the assay was due to the fact that it was impossible to sample perfectly, there being a precipitate of lead sulfate present. The analysis of an acetate nickel bath in which the amount of lead precipitate was very slight gave much better agreement with the amount of lead added as shown in Table IV.

This method for the determination of lead can be used for other types of electroplating baths. The results obtained for a cyanide copper bath and for a cyanide silver bath of the type proposed by Wood are shown in Table IV.

TABLE IV
Lead Analyses for Various Baths

Type of Bath	Lead Added, Mg./l.	Analysis, Mg./L. Routine	Analysis, Mg./L. Assay
Copper Cyanide	0	0	0
Copper Cyanide	40	39	41
Copper Cyanide*	50	45	47
Silver Cyanide	0	0	0
Silver Cyanide*	40	38	----
Acetate Nickel	0	0	0
Acetate Nickel	25	25	23

*Precipitate present in the solution.

Stannous and thallous ions must be oxidized or they interfere with the determination. When analyzing acid tin baths, therefore, the tin must be oxidized with nitric acid, baked, and the metastannic acid removed by filtration.

The above results indicate the sensitivity of the colorimetric method for lead. When clear solutions are analyzed, the checks will be about plus or minus two milligrams or better, and the average of several samples from the same bath will check within two milligrams of the true

amount of lead present. Although originally developed for traces of lead in plating solutions, the method is recommended for the analysis of any solution containing less than half a gram of lead per liter. For concentrations greater than this the dilution is considerable, resulting in a large multiplication of any error.

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PROGRAM

10:00 A.M. **Greetings.** The Electrochemical Society, Chicago Section. H. R. Alley, Chairman.

10:15 A.M. **"Chicago's Status as an Industrial Center"**
W. O. Batchelder, Commercial Vice-President General Electric Company and President of Industrial Development Committee, Chicago Association of Commerce.
E. P. Querl, Manager, Industrial Department, Chicago Association of Commerce.

10:45 A.M. **"Electric Power for Chicago Industries"**
T. G. LeClair, Staff Engineer, Commonwealth Edison Company.

11:45 A.M. **"Trends in Industrial Research"**
Dr. Harold Vagtborg, Director, Armour Research Foundation, Chicago.

12:00-1:00 **Luncheon.** Cafeteria of Museum of Science and Industry.

1:00 P.M. **"Trends in Our Nation's Electrochemical Industries"**
S. D. Kirkpatrick, President of The Electrochemical Society and Editor of Chemical and Metallurgical Engineering.

1.40 P.M. **"Reminiscences and Future Prospects in Electrochemistry"**
Dr. C. F. Burgess, Chairman of the Boards of Directors of Burgess Battery Company and C. F. Burgess Laboratories, Inc.

INDUSTRIAL PROCESSING SYMPOSIUM

2:10 P.M. **"Basic Economic Factors Affecting the Establishment of an Electrochemical Industry"**
R. B. Wittenberg, International Minerals & Chemical Corporation.

3:10 P.M. **"Electricity—an Indispensable Agent for Industrial Progress"**
H. E. Dralle, Westinghouse Electric & Manufacturing Company.

3:40 P.M. **"Opportunities for Electrochemical Industries"**
Dr. C. A. Crowley Graham, Crowley & Associates, Inc.

4:10 P.M. **"Informal Discussion Period"**
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5:00 P.M. **Adjournment**

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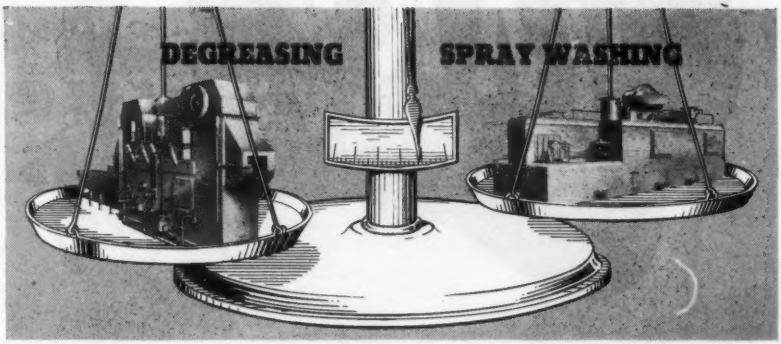

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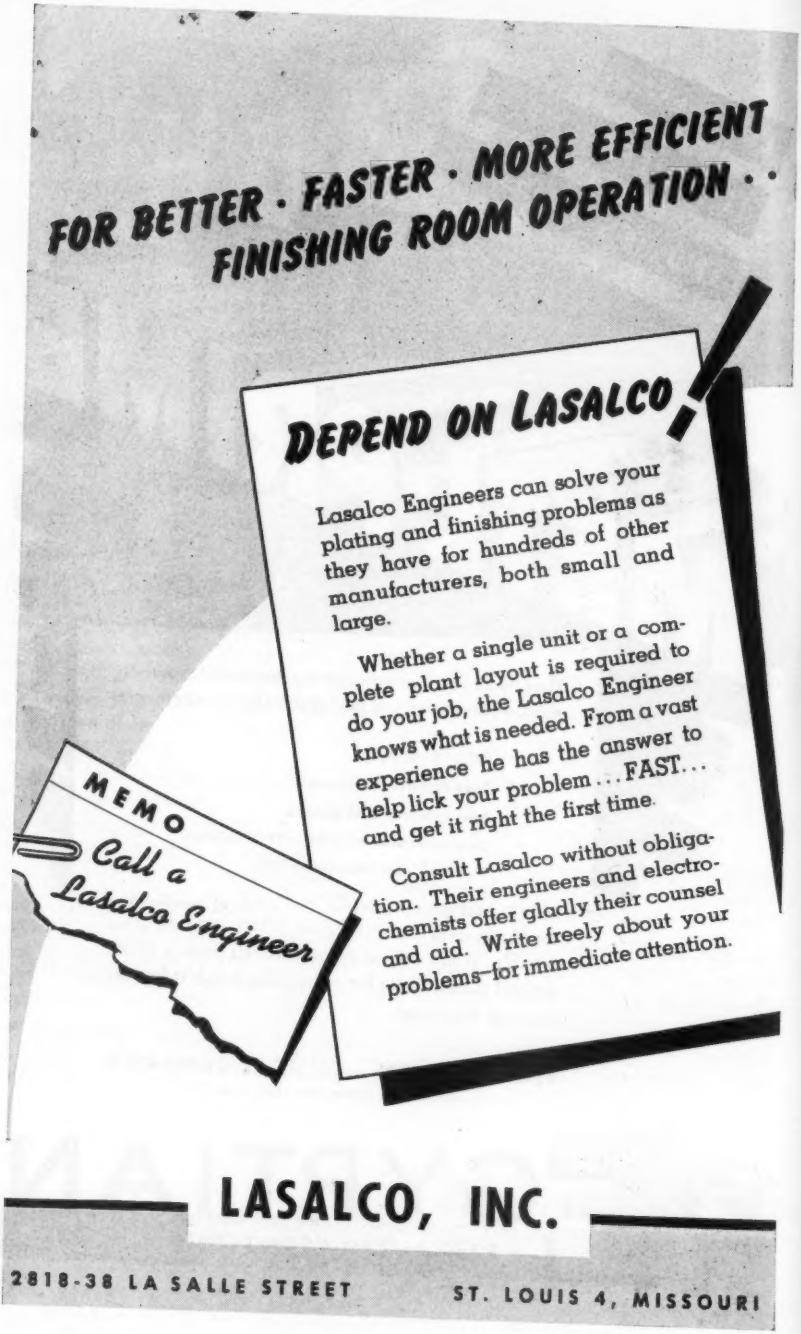
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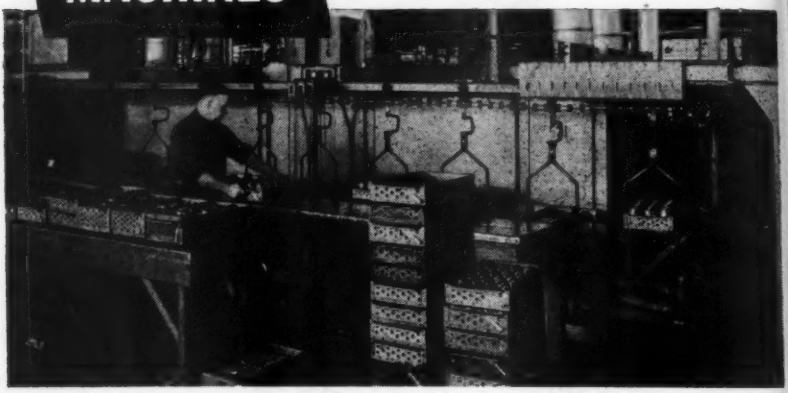

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MEASUREMENT OF pH OF ANY ELECTROPLATING SOLUTION WITHOUT A BUFFER SOLUTION

By ALBERT HIRSCH

Introduction

THEY that have experienced the joy and thrill that one gets when measuring pH with a fine instrument like a potentiometer or a colorimetric set will appreciate the position of one who is less fortunate and does not have a fine instrument to measure pH with. I am, therefore, dedicating this article to the Electroplater who has initiative and must get along with such tools as one has at hand. The theory of pH is quite complicated, however, that need not concern us at present, because, most platers know enough about pH to be only interested in its measurement.

Required Apparatus

A block of white pine or poplar wood size: 4" x 2⅝" x 2½". With a $\frac{9}{16}$" twist drill, drill three sets of holes vertically in the block, that is to say, from top to bottom of the block, but, not through the bottom of the block; the holes should be arranged three holes in a row after the other and three separate rows. Next drill three $\frac{9}{16}$" holes horizontally at the center of the face of the block and through the block. These holes should be drilled through the centers of the long side of the vertical holes; to make a window as it were. See drawing. A block so arranged can be used for a colorimetric comparator provided test tubes (12mm, o.d. × 100mm) are used to fit the holes. Twenty-four test tubes with rubber stoppers are required.

Reagents

Preparation of an approximate 0.05 N hydrochloric acid solution. With a burette measure 4.16 ml. of concentrated hydrochloric acid (sp.

gr. 1.2) into a graduate liter flask and dilute to the gradution mark with distilled water.

Preparation of an approximate 0.05 N sodium hydroxide solution. Weigh 2 g. of sodium hydroxide, dissolve in water and dilute to one liter in a graduate liter flask.

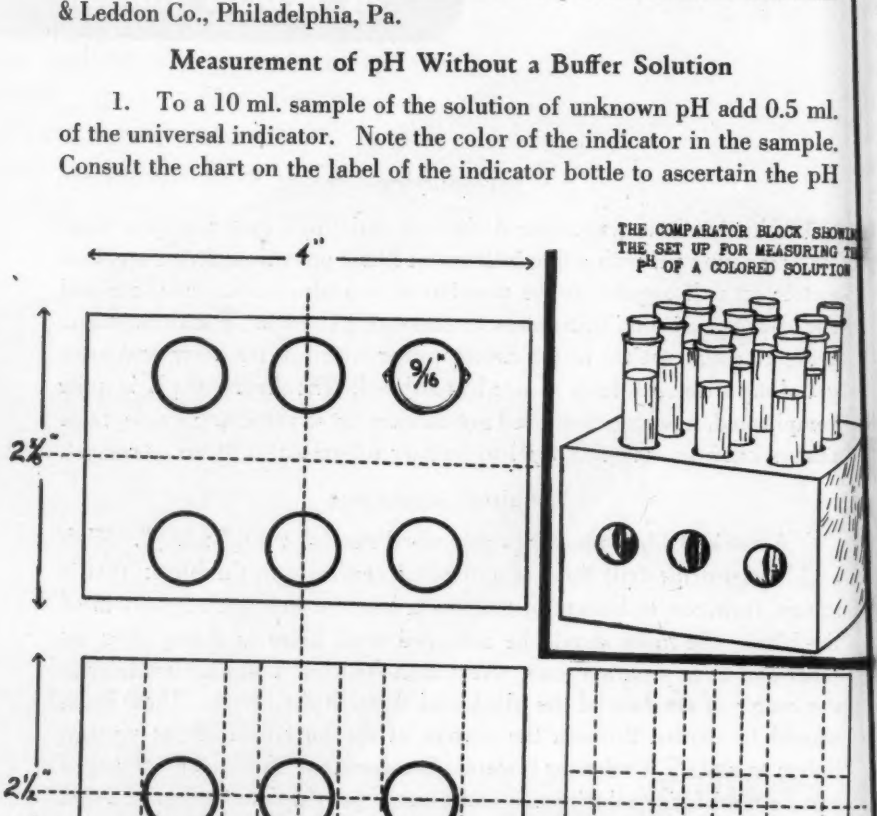
Harleco improved universal wide range Indicator as purchased. This indicator has a color range of red, orange, yellow, green, blue and violet. It also covers the pH range from O to 14.

To prepare indicator solutions Parstains Assortment "A" is recommended. Ten capsules, each capsule contains 0.1 grams of material sufficient for 250 mls. a 0.04% solution.

Note: These indicator materials can be purchased from Hartman & Leddon Co., Philadelphia, Pa.

Measurement of pH Without a Buffer Solution

1. To a 10 ml. sample of the solution of unknown pH add 0.5 ml. of the universal indicator. Note the color of the indicator in the sample. Consult the chart on the label of the indicator bottle to ascertain the pH



range of the sample solution. For example, suppose the color of the universal indicator was orange and the pH range was 3./ to 4.4. Then methyl-orange indicator could be used for the color standards.

2. Preparation of a 0.04% solution of methyl-orange indicator. Weigh 0.10 g. of the powdered indicator and dissolve in 250 ml. of hot water, filter the solution, bottle and label bottle.

3. Prepare a set of color standards as follows:[2] In one set ten test tubes, put in each separate tube 5 ml. of 0.05 N hydrochloric acid and 5 ml. of water. To the first tube add one drop of indicator as prepared. Stopper the tube and label it 1-"A" the figure 1, in this case, represents the number of drops of the indicator; the letter "A", in this case, indicates the acid color of the indicator. Finally, prepare the other nine tubes with indicator by adding two drops of indicator, three drops, etc.; until the last tube receives ten drops of the indicator. Stopper and label all tubes of the acid test.

4. In a like manner prepare another set of ten test tubes with 5 ml. of 0.05 N sodium hydroxide and 5 ml. of water. To the first tube add one drop of the indicator, stopper the tube and label it 1-"B", the figure 1, in this case, represents the number of drops of the indicator; the letter "B", in this case, indicates the basic color of the indicator. Finally, prepare the other nine tubes with indicator by adding two drops of indicator, three drops, etc.; until the last tube receives ten drops of the indicator. Stopper and label all tubes of the alkaline or basic set.

5. To make a pH measurement, measure a 10 ml. sample of the test solution of unknown pH into one of the test tubes, add nine drops of the indicator solution stopper and shake well.

6. Place this tube in the front center hole of the comparator block. Provided, the test solution is in the acid range, place in the hole behind the test solution the basic tube containing one drop of the indicator or tube marked 1-"B". (If the test solution is in the basic range, that is to say, high pH range place behind it the tube marked 1-"A".) Now proceed to match the color of the test solution with any pair of standard color tubes, that is to say, using one "A" tube and one "B" tube by placing one after the other in any pair of holes on either side of the test solution.

7. It is well to use a pair of tubes containing 10 drops of the indicator in both tubes, for example, a 3-"B" tube and a 7-"A" tube both together will contain 10 drops of indicator. Note, the true color of the indicator is seen when observed through the acid and basic color of the indicator in a pair of tubes as described above.

8. Calculation of the pH[3]:
Equation (1)

$$pH = p_k in + \log \frac{\text{Amount of basic color}}{\text{Amount of acidic color}}$$

or equation (2)

$$pH = p_k in + \log \frac{\text{"B" color}}{\text{"A" color}}$$

For example: In this case, the set of color standards were made using methyl-orange as indicator. The $p_k in$ value or exponent of methyl-orange is 3.7. Suppose the test solution color was matched with a pair of color tubes, one of which had 3 drops of indicator (3-"B" tube) and the other tube contained 7 drops of the indicator (7-"A" tube).

Then equation (2) becomes:

$$pH = 3.7 + \log \frac{3}{7}$$
$$= 3.7 - 0.602$$
$$pH = 3.1$$

Note:—the log of 3/7 equals minus 0.602.

Therefore, in this case, the pH of the solution tested is 3.1.

9. The tested solution in the above case was a colorless solution. Suppose, the solution, the pH of which was to be measured, was a colored solution, for example, a nickel solution. When the solution is a colored solution it is necessary to modify the set up in the comparator block. In such a case, it will be necessary, to place behind the test solution containing 9 drops of the indicator and the indicator tube containing one drop of indicator, a tube of clear water.

Behind, the pair of standard color tubes, used for matching the color of the test solution, place a tube of the colored solution without any indicator in it. In this manner the pH of a colored solution can be measured without any difficulty.

10. We have checked, many solutions, the pH of which had been measured with the above method, with a Leeds & Northrup potentiometer and found the colorimetric measurement to be within the range of 0.5 of a pH higher than when measured with the potentiometer.

Indicators

The theory of indicators is quite complicated, again, that need not concern us in this discussion, suffice to say an indicator is a substance which changes color due to the pH of the solution in which it is placed. Again, it is a substance which gives a variation of color in an acid solu-

tion and a different variation of color in an alkaline solution. It can readily be seen that a substance which gives a color due to the environment or pH of the solution in which it is placed can be used for the measurement of pH, provided, the $p_k$in value of the indicator is known. The $p_k$in value of many indicators can be found in text books on electrochemistry.

This $p_k$in is a symbol, the letter "p" is taken from the word power, as in the expression, powers of ten. The letter "k" is a figure representing the exponent of the indicator. The "in" part of the symbol is taken from the word indicator, and in this case, means the whole symbol belongs to indicators. The $p_k$in symbol is very much like the pH symbol. It is a well known fact, that, the pH symbol stands for the hydrogen ion concentration of any solution. The $p_k$in symbol stands for the expondent of the indicator, it is in a sense, a numerical value representing the point at which the indicator changes color, or, may I say, the pH at which the indicator changes color. The $p_k$in or expondent of an indicator is a numerical value, that when a figure, approximating the figure one is subtracted or added to the exponent the subtrahend and the sum represent the pH range of the indicator. For example, the $p_k$in or exponent of methyl-orange is 3.7 and the pH range is 3.1-4.4.

TABLE XL[4]

Indicators recommended by Clark

Indicator	p_k*in*	*pH range*	*Color Change* *Acid*	*Alkaline*	*Chemical Name*
Meta-cresol purple	1.51	1.2-2.8	Red	Yellow	m-cresol sulphonephthalein
Thymol blue	1.51	1.2-2.8	Red	Yellow	thymol sulphonephthalein
Bromphenol blue	3.98	3.0-4.6	Yellow	Blue	tetrabromphenol sulphone-phthalein
Bromcresol green	4.67	3.8-5.4	Yellow	Blue	tetrabrom-m-cresol sulphone-phthalein
Chlorphenol red	5.98	4.8-6.4	Yellow	Red	dichlorophenol sulphone-phthalein
Bromphenol red	6.16	5.2-6.8	Yellow	Red	dibromophenol sulphone-phthalein
Bromcresol purple	6.3	5.2-6.8	Yellow	Purple	dibromo-o-cresol sulphone-phthalein
Bromthymol blue	7.0	6.0-7.6	Yellow	Blue	dibromothymol sulphone-phthalein
Phenol Red	7.9	6.8-8.4	Yellow	Red	phenol sulphonephthalein
Cresol Red	8.3	7.2-8.8	Yellow	Red	o-cresol sulphonephthalein
Metacresol Purple	8.32	7.4-9.0	Yellow	Purple	m-cresol sulphonephthalein
Thymol Blue	8.9	8.0-9.6	Yellow	Blue	thymol sulphonephthalein
Cresol phthalein	9.4	8.2-9.8	Colorless	Red	o-cresolphthalein

OTHER INDICATORS

Methyl orange (0.01%)	3.7	3.1-4.4	Red	Yellow	p-benzene sulphonic acid-azodimethyl aniline
Methyl Red (0.02%)	5.1	4.2-6.3	Red	Yellow	o-carboxybenzene-azo-dimethylaniline
p-nitrophenol (0.04%)	7.1	5.6-7.6	Colorless	Yellow	p-nitrophenol
phenolphthalein (0.05%)	9.4	8.3-10.0	Colorless	Red	phenolphthalein

1. Electroplater, Chemist & Superintendent, Snyder Mfg. Co., Philadelphia 40, Pa. Active member Philadelphia Branch A. E. S.

2. Principles of Electroplating & Electroforming. Blum & Hogaboom, 2nd ed. 1930, P. 269.

3. The Fundamentals of Electrochemistry and Electrodeposition. Samuel Glasstone. A. E. S. 1943, P. 41-43.

4. The Electrochemistry of Solutions. S. Glasstone, 1930, P. 233.

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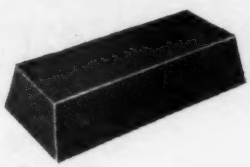

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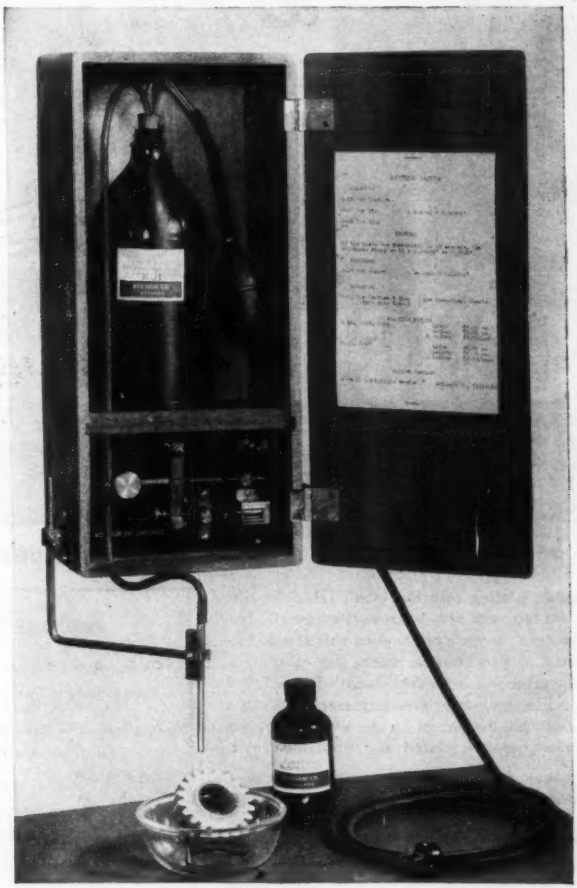

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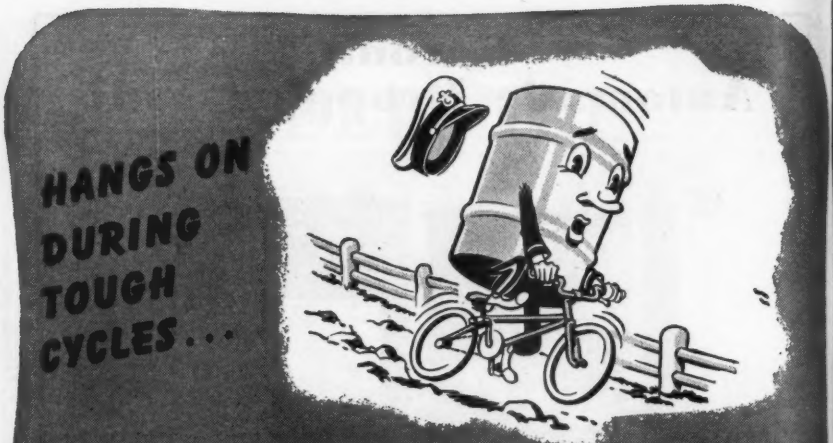

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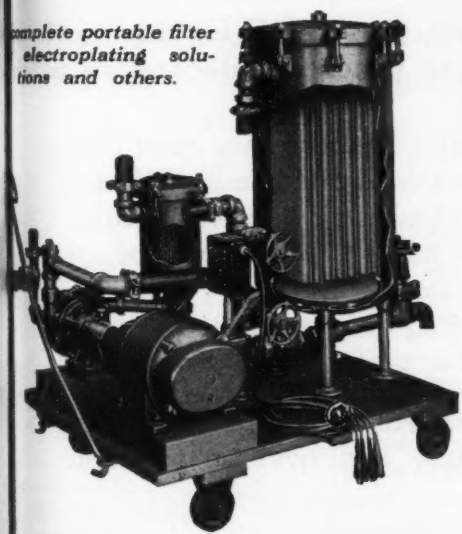

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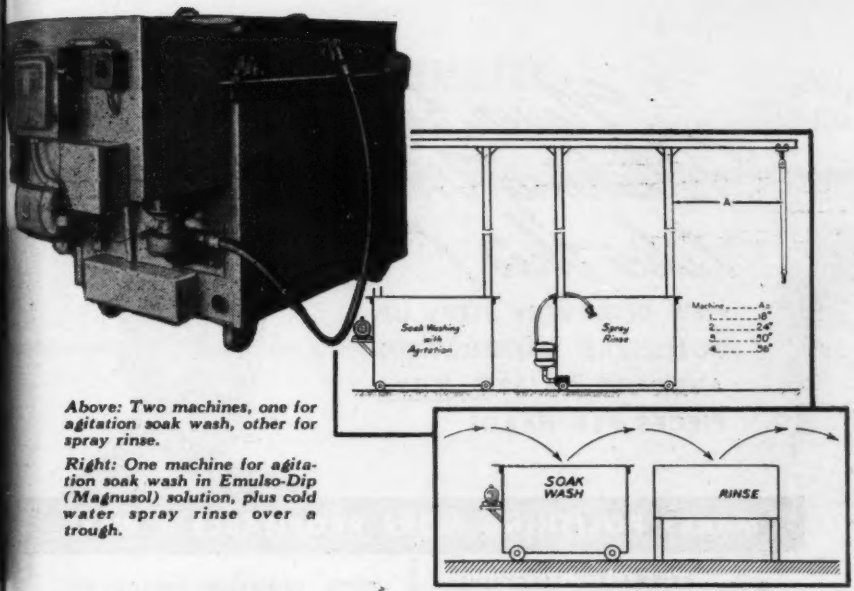

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PART XIV THE CHEMISTRY OF SOME COMMON BASES

Samuel Gladstone, D. Sc. Ph. D.

Bases in Electroplating

THE characteristic properties of bases were described in a general manner in Part XIII (*Monthly Review*, November 1944), and just as was done with acids, the present article will be devoted to a more detailed consideration of a few bases which are of importance in electroplating. These are sodium and potassium hydroxides (the caustic alkalies), calcium hydroxide and ammonia, or its solution in water, sometimes called ammonium hydroxide. Caustic soda and potash, particularly the former, are frequently used in the preparation of alkaline plating baths, such as those of zinc and cadmium cyanides and stannate tin, and also for pH adjustment. Alkaline solutions are also employed for cleaning aluminum and for various stripping purposes. Further, calcium hydroxide, in the form of "milk of lime," is recommended in connection with the removal of iron from copper plating baths.

Sodium and Potassium Hydroxides: Manufacture

The methods of manufacture and properties of the caustic alkalies, sodium and potassium hydroxides, are so similar that they may be considered together. Two main procedures are employed at present time for the preparation of these bases. The most important involves the electrolysis of, that is the passage of electric current through, a solution of the chloride. In the case of sodium hydroxide (caustic soda) this is sodium chloride, while for potassium hydroxide (caustic potash) the salt used is potassium chloride. In the more modern processes the anodes (positive electrodes) are made of carbon, in the form of graphite, while the cathodes (negative electrodes) are usually of perforated steel. The positive and negative electrodes are separated from each other by a porous asbestos diaphragm, placed close to the latter electrode. One

purpose of this diaphragm is to prevent mixing of the solutions surrounding the separate electrodes, while not preventing the flow of electric current.

Upon electrolysis, chlorine gas is liberated at the carbon anodes; the gas is lead off by suitable pipes and compressed into steel cylinders. Chlorine is an important industrial chemical, and large quantities of it are obtained in this manner as a by-product in the manufacture of caustic alkalies. At the steel cathodes hydrogen gas is liberated, and as a result the solution in the vicinity of these electrodes becomes alkaline. (For explanation, see "The Fundamentals of Electrochemistry and Electrodeposition," Chapter XVI, page 67; the discharge of hydrogen ions to form hydrogen gas is accompanied by an increase in the hydroxyl ions remaining in the solution.) The asbestos diaphragm keeps the resulting alkali solution from excessive contamination by the chloride which is being electrolyzed, and also prevents access of chlorine gas which would react with it. This alkaline liquid, consisting of a dilute solution of sodium or potassium hydroxide together with a certain amount of chloride, is continually run off and evaporated by the application of heat. The chloride separates out in the form of solid, because it is less soluble than the hydroxide, leaving a fairly pure solution of the latter. Upon continued heating, all the water is driven off and the caustic alkali is eventually obtained, upon cooling, as a white solid. It can be melted by heating, and the liquid is cast into sticks, pellets or flakes, in which form it appears on the market. Concentrated, but not very pure, aqueous solutions of the caustic alkalies, called "lye," are frequently employed in industry.

Considerable amounts of caustic alkalies are also made by an older chemical process which does not involve the use of electric current. The starting material is sodium or potassium carbonate, obtained by indirect chemical methods from the corresponding chlorides. A solution of the carbonate is then heated with slaked lime, $Ca(OH)_2$, the properties of which are described below. Thus, for the preparation of sodium hydroxide the reaction between sodium carbonate (Na_2CO_3) and the lime is represented by the equation

$$Na_2CO_3 + Ca(OH)_2 = CaCO_3 + 2NaOH$$

The calcium carbonate ($CaCO_3$) formed in the process is insoluble in the water and remains as a white solid precipitate which can be easily removed by filtration. The clear solution then contains sodium hydroxide (NaOH), and this can be obtained in a pure form by evaporation of the water, as described above. Potassium hydroxide (KOH) can be prepared in an exactly similar manner, starting with potassium carbonate (K_2CO_3) and slaked lime.

Sodium and Potassium Hydroxides: Properties

Sodium and potassium hydroxides are both white solids in the pure form. They are exceptionally soluble in water; the solutions are strongly alkaline and have a corrosive (caustic) action on flesh. Great care should be exercised when preparing solutions of caustic alkali from the solid. A great deal of heat is evolved upon the addition of water, and the resulting caustic liquid can produce serious burns. As with other bases (see Part XIII), the solutions turn red litmus blue, turn the color of methyl orange to yellow, and that of phenolphthalein to pink. Related to the ease with which it dissolves in water is the fact that solid caustic soda or potash will absorb moisture and become wet when exposed to air. This general property, which is possessed by certain other substances, e.g., calcium chloride, is known as "deliquescence." The resulting liquid, which is a concentrated solution of the alkali in water, will rapidly take up the carbon dioxide gas which is always present in the air. This gas has acidic properties in solution and so it neutralizes the base, i.e., the caustic alkali, to form a salt, sodium or potassium carbonate, depending on whether sodium or potassium hydroxide was used. It follows, therefore, that if solid caustic alkali is exposed to air it will eventually change into the corresponding carbonate. For this reason the alkali hydroxides should always be kept in closed containers and not left open to the air.

Preparation and Properties of Lime

Lime, or calcium oxide (CaO), is manufactured by heating calcium carbonate ($CaCO_3$) which is found in nature as the common mineral "limestone." The reaction which takes place is

$$CaCO_3 = CaO + CO_2,$$

the carbon dioxide gas (CO_2) being carried away in a current of air. The product CaO, called "quicklime," is obtained as white solid lumps. If water is added to quicklime a great deal of heat is evolved, and the lumps fall into a powder; the reaction which occurs is simply

$$CaO + H_2O = Ca(OH)_2.$$

The resulting powder is calcium hydroxide, $Ca(OH)_2$, generally known as "slaked lime" or "hydrated lime." Calcium hydroxide, unlike the hydroxides of sodium and potassium, is not very soluble in water, and hence when water is added a creamy slurry, called "milk of lime," is obtained. If a sufficient quantity of water is present for the lime to dissolve completely, the resulting liquid is known as "lime water." All forms of lime are basic and can neutralize acids. Because of its low cost, lime is commonly used for this purpose in industry, particularly when a clear solution is not essential. Like the caustic alkalies, exposure of lime to air results in the taking up of both water and carbon dioxide,

although the solid does not become wet. The resulting substance, consisting partly of calcium carbonate, is referred to as "air-slaked lime."

Preparation and Properties of Ammonia

Large quantities of ammonia (NH_3) and its salts are made by the "synthetic process"; a mixture of the two gaseous elements nitrogen and hydrogen, of which ammonia is composed, is passed over a specially prepared solid, called a "catalyst," at temperatures of about 500° C. and pressures of 200 atmospheres. Part only of the nitrogen and hydrogen are converted into ammonia, and this is removed by cooling the emerging gas; the ammonia condenses to a liquid ("liquid ammonia"), and is thus separated from the reacting gases. Ammonia is also obtained as a by-product in the manufacture of coke and gas from soft coal. The coal is heated and the gases produced are passed through water; the resulting liquid, known as "ammoniacal liquor," contains free ammonia and various ammonium salts dissolved in it. The liquor is heated with lime when gaseous ammonia distils over. The gas, after drying, may be compressed and liquefied, and sold in cylinders or tank-cars. Alternatively, the gas may be dissolved in water to form the familiar ammonia solution, containing ammonium hydroxide, NH_4OH, viz.,

$$NH_3 + H_2O = NH_4OH.$$

The ammonia, being a base, can also be absorbed in hydrochloric or sulfuic acid solution to fom the corresponding salt, ammonium chloride, NH_4Cl, or ammonium sulfate, $(NH_4)_2SO_4$, respectively.

Ammonia gas is colorless and has a pungent odor; it can be liquefied by cooling to —33° C. or by compression. Because it is readily liquefied ammonia is used in commercial refrigeration. Ammonia gas is very soluble in water; as much as 1300 volumes of the gas will dissolve in one volume of water at ordinary temperatures and atmospheric pressure. The gas may be expelled from the solution by heating. Ammonia solution has the usual basic properties, although to a lesser extent than the caustic alkalies; in fact ammonia is regarded as a "weak" base, compared with the caustic alkalies, which are "strong" bases.

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Lasting Corrosion Resistance + Beauty For Zinc, Cadmium Plated Products

Send now for a sample panel of Iridited plating to test in your own laboratory

When leading manufacturers want an attractive corrosion-resistant final finish, they choose the best. That's why these "big names" . . . and many others . . . are using Iridite on the zinc or cadmium surfaces of their wartime and consumer products.

Proved on the warfronts and in major testing laboratories, Iridite means *longer life* for zinc and cadmium surfaces of products. Its wide range of attractive colors means, too, *added beauty and salability*. Colors available include blues, greens, maroons, bronze, olive drab, black and blue-black. And, because of Iridite's excellent qualities as a paint base, all colors can be clear-lacquered for even greater durability.

We urge you to test for yourself this proved and widely specified new process. Send now for a sample panel to test in your own laboratory . . . together with full information and operating details. We believe you'll find, as so many manufacturers have, that Iridite is exactly the "finishing touch" you've been looking for. Write, phone or wire: Rheem Research Products, Inc., 712 Chemical Building, 2523 Pennsylvania Ave., Baltimore 17, Maryland.

RHEEM RESEARCH PRODUCTS, INC.
IRIDITE
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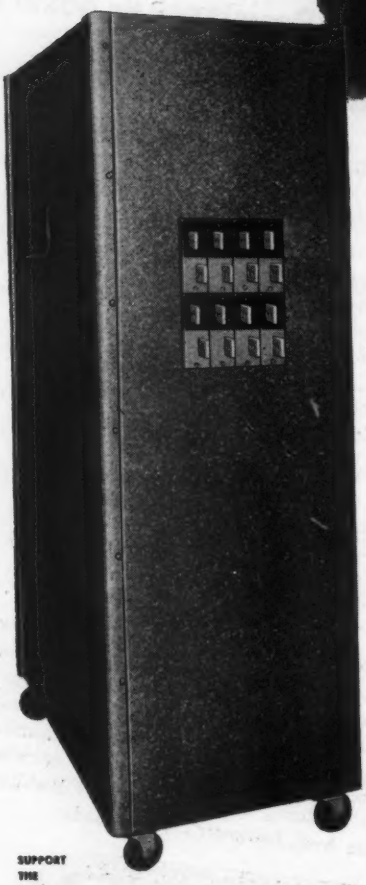
GREEN
grows the
RECTIFIERS



In the fertile minds of Green engineers a seed is planted, nourished, developed. And that seed ultimately bears fruit in the form of a revolutionary rectifier design. Product of a recent harvest is the Green Multi-Plater which provides, in one cabinet, *eight* separate selenium rectifier sections, each having an output capacity of 6 volts 500 amperes.

Because the sections may be used separately, grouped together for higher voltage or greater current capacity, or used in a single bank, the Multi-Plater offers a flexibility that has never before been possible. For example, if all eight sections are interconnected, any one of the following outputs may be obtained: 6 volts 4000 amperes . . . 12 volts 2000 amperes . . . 24 volts 1000 amperes . . . or 48 volts 500 amperes. Yet, this Green development is but 42" wide, 24" deep, approximately 81" high . . . and occupies *floor space of only 7 square feet.*

In addition to the standard Multi-Platers which provide internal connections for operation from 220 or 440 volt 60 cycle, 3 phase supply, units for any other supply voltage can be furnished. Multi-Platers are available also with four or six rectifier sections. *Write for complete details.*

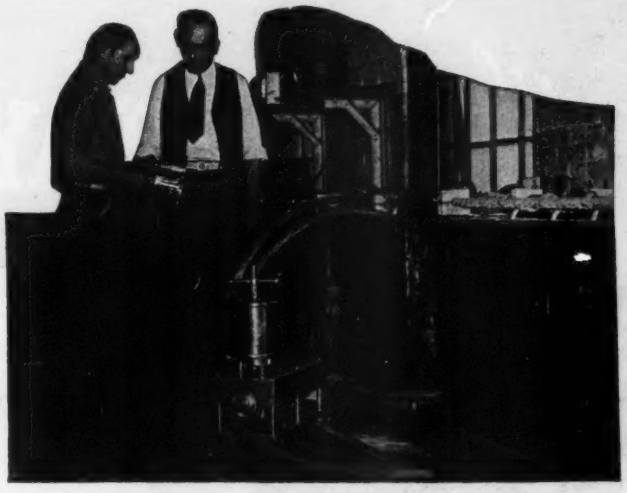
SUPPORT THE SIXTH WAR LOAN DRIVE

"Rectifier Engineering is our Business"
No matter what application you may have for Direct Current, Green Rectifier Engineers will design and build equipment to your requirements.

W. GREEN ELECTRIC COMPANY, INC.

GREEN EXCHANGE BUILDING 130 CEDAR STREET NEW YORK 6, N.Y.

RECTIFIER G ENGINEERS



Alsop "SEALED DISC" FILTERS

MAKE PLATING SOLUTIONS CLEAN

Every plating man knows this to be true and he also knows that clean plating solutions mean finer finishes, fewer rejects to be done over again. This low cost filtration pays real dividends.

Alsop "Sealed Disc" Filters are made in portable types for all capacities. Also for all kinds of liquids, Water, Acids, Chemicals, special types for all Oils, etc.

Learn all about this remarkable form of filtration.
We'll send our book. You drop us a card.

ALSOP ENGINEERING CORP.
36 GRAND STREET **MILLDALE, CONN.**

*Ventilated NON-FRAYS

THE MARK OF QUALITY

Also RIPPLE SEWED CHAMPION PIECED BUFFS

Polishing Wheels and Burring Bobs for every Operation

We are engaged essentially in War Work

*Patent Nos. 2,027,863; 2,094,650; 1,573,961; Re. 19,894; 2,140,208

F.L.&J.C.

TRADE MARK

CODMAN COMPANY

Buffing and Polishing Wheels

ROCKLAND • MASSACHUSETTS

DETROIT OFFICE 7637 OAKLAND AVENUE

PHILADELPHIA OFFICE, 1123 REAL ESTATE TRUST BLDG.

PHILADELPHIA 7, PENNSYLVANIA

YOU CAN'T MISS

when you use

DU PONT ZINC BALL ANODES

You'll save time and trouble by using Du Pont Zinc Ball Anodes whenever ball-type anodes are required for zinc plating.

These Du Pont anodes are cast from highest quality zinc. Each ball weighs 1 lb., 1 oz. Each is embossed with the Du Pont oval—a feature which permits quick, positive identification. A glance tells the user that it is a zinc anode—no chance of confusing it with cadmium.

As an added convenience, Du Pont Zinc Ball Anodes are stocked in many cities throughout the country. This means quick delivery to you—no matter where you're located.

Du Pont Technical Service is ready to assist you with advice on the best use of these ball anodes and on any plating problems you may have. For more details, write, wire or telephone our nearest district office or: E. I. du Pont de Nemours & Co. (Inc.), Electroplating Division, Wilmington 98, Delaware.

DU PONT

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DU PONT CHEMICALS • PROCESSES • SERVICE

for **ELECTROPLATING**

Better Things for Better Living . . . *Through Chemistry*

First
BECAUSE THEY'RE
Finest

AMERICAN
MADE
Felt
POLISHING
WHEELS

"American Made" Felt Polishing Wheels are made of high grade pure wool. No loading or weighting of any character is used. The material is uniform in texture throughout the wheel. Hardness is acquired by shrinkage of wool only — the greater the shrinkage the harder the wheel. Made in any diameter, also in face widths from ½" to 6". For wider face widths, submit specifications. "American" felt wheels are made in nine degrees of hardness.

Write, wire or phone for further information

AMERICAN BUFF COMPANY
Factory & General Offices
711 WEST LAKE STREET, CHICAGO 6, ILLINOIS
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"The trend is to PENTRATE"
FINISH PENTRATE
Huge quantities of war materials have proven the worth of Pentrate as a durable steel finish. The rich black "quality-look" of Pentrate has sales appeal in addition to its rust resistant and friction reducing characteristics. Send for our Pentrate booklet — it will pay you to investigate this economical, low temperature finish for steel.
HEATBATH CORPORATION
SPRINGFIELD • 1 • MASSACHUSETTS

Memo to customers RE:

In reconversion to the production of peacetime goods, many of our customers will require the same finishing materials they used before the war. We assure them that now we are able to supply whatever their need of *Full Disc and Triplex Buffing Cloth, Felt, Polishing Wheels; Acme White Finish and No Cast Lime* [illegible]

Manufacturers of a complete line of electroplating and polishing equipment and supplies

HANSON-VAN WINKLE-MUNNING CO.

MATAWAN, NEW JERSEY

PLANTS: Matawan, New Jersey • Anderson, Indiana • Bridgeport, Connecticut

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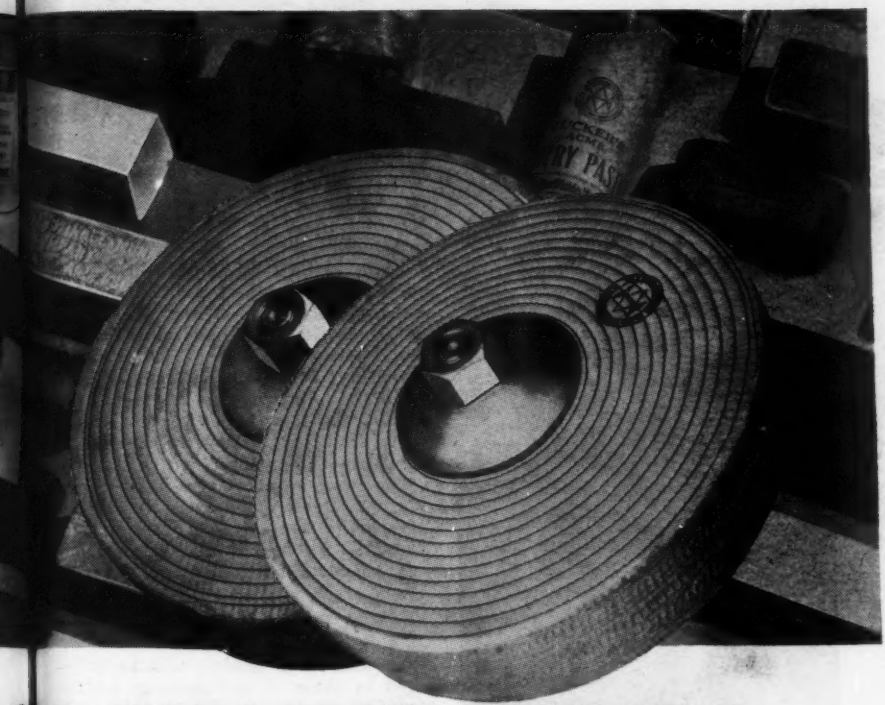

RE: ITEMS AGAIN AVAILABLE

ion *rades of Tripoli and special Buff-*
r co *Compositions* as well as *Rouges.*
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re th ntity of *Sisalin Sections* and
w w per compounds for various
th hing operations. These Sisalin
Buff ions are extremely efficient in
Acm hing work when used with Steel
Lim ge for one-wheel operation on
lding strip, window frame, flat iron and waffle-iron tops, toaster doors, etc., prior to plating.

To meet your present or future needs, we at plating headquarters are ready to discuss with you the latest finishes for products being redesigned or retooled — or for new products. We offer you the benefit of our 124 years experience in the metal processing industry.

Manufacturers of a complete line of electroplating and polishing equipment and supplies

CO. HANSON-VAN WINKLE-MUNNING CO.

MATAWAN, NEW JERSEY

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HANSON-VAN WINKLE-MUNNING CO. MATAWAN, NEW JERSEY, U.S.A. SINCE 1840

INDUSTRY NEWS

"Larry" Nagle Made National Sales Manager

L. K. Lindahl, president of the Udylite Corporation, Detroit, announces the appointment of L. V. ("Larry") Nagle as Vice-President in Charge of National Sales, for that company.

Mr. Nagle has been active in the metal finishing field for over seventeen years, having been Michigan Sales Manager for the Udylite Corporation for the last thirteen years.

"Larry" is a member of the class of '26 University of Detroit, and is widely known throughout the trade for his activities.

His broad knowledge of metal finishing was gained by first hand acquaintance with platers and their problems.

Expands Staff

Pennsylvania Salt Manufacturing Company announces the following additions to its Research and Development staff:

Miss Isabella A. Romans, formerly with Chloramine Corporation; Dr. George McCoy, formerly instructor of Organic Chemistry at the University of Pennsylvania; Mr. Ward W. Whitebread of General Chemical Company; Mr. Harry Green of Lion Oil Refining Company; Mr. Savin Zavarella of Pratt Whitney Aircraft Corporation; Mr. Harold B. Staley of Cochrane Corporation; and Dr. Frank W. Panepinto of the Warner Company.

New staff members also include Miss Mary F. Hensler and Miss Helen Cunningham of the College of Chestnut Hill and Miss Mildred E. Raesler of Pennsylvania State College.

A.S.T.M. Meetings

No doubt our readers will be interested in some of the meetings of the American Society for Testing Materials to be held during the remainder of 1944 and in 1945. The following list includes national meetings of the Society and a number of local meetings sponsored by District Committees in various industrial centers.

1945 Spring Meeting, Pittsburgh, Hotel William Penn, February 28, 1945.

A.S.T.M. Committee Week, February 26 to March 2, 1945, Pittsburgh, Hotel William Penn.

1945 (Forty-eighth) Annual Meeting, Buffalo, Hotel Statler, June 18 to June 22, 1945.

Joint A.S.T.M.-A.I.M.E. Symposium on Stress-Corrosion Cracking, November 29 to December 1, 1944, Hotel Benjamin Franklin, Philadelphia.

Detroit District—Life Testing of Materials, November 21, 1944, Detroit Engineering Society, Detroit.

Philadelphia District — Symposium on Magnetic Particle Testing, January 22, 1945, Hotel Benjamin Franklin, Philadelphia.

New York District — Petroleum and Some of Its Modern Derivatives, January 17, 1945, Engineering Societies Building, New York.

Philadelphia District — Symposium on Experimental Stress Analysis, April 12, 1945, Franklin Institute, Philadelphia.

Divine to New Location

After November 20th the main office of Divine Brothers Co. will be located at 200 Seward Avenue, Utica 1, N. Y. Part of the manufacturing operations have been moved and the remainder will follow as rapidly as possible.

Wiles Visits A.E.S.

Mr. J. Kenneth Wiles, managing director of Wiles Manufacturing Co., Ltd., Adelaide, South Australia paid a visit to the offices of A.E.S. recently.

Mr. Wiles' ocmpany has been manufacturing portable cooking units widely used by the armed forces. The company operates a sizable plating plant in connection with the manufacture of the units. Everything but the wheels and tire are made in the Wiles' Plant.

Mr. Wiles had interesting experiences to relate and he gave a rather up-to-the-minute civilian report of the several war fronts which he has visited. After a few more weeks in America, Mr. Wiles will return to Australia.

Industrial Finishes Salesmen

Industrial finishes salesmen wanted: One for Indianapolis and surrounding territory, and one for Cleveland and surrounding territory. Wanted by an old, well established Eastern manufacturer of a complete line of lacquers, synthetics and other industrial finishes. Splendid opportunity for right man. Please state age, draft status, education, income expectations, and experience. When replying address BOX MR-12.

Speakers Available

Listed below are additional speakers available to Branches for the East and mid-West. Expenses are paid by Frederick Gumm Chemical Company, Inc.

Robert R. Sizelove; Arthur S. Kohler; Sidney L. Boyar.

Topics which they can discuss are as follows:

(1) Chemical Finishing of Magnesium Alloys.

(2) Chromic Acid Anodizing Control and Color Dyeing Procedure.

(3) Tumble Deburring and Tumble Surface Finishing of all Metals.

(4) Chemical Treatment of Aluminum Prior to Spot-Welding and Electroplating.

(5) Electroplating with Superimposed Alternating Current.

News from England

Mr. A. W. Hothersall residing in London, England, who has many A.E.S. friends recently wrote Dr. Dupbernell. It is believed a portion of his letter will interest *Review* readers and is reproduced herewith.

"I was on the point of writing to you some months ago but the advent of the flying bomb was rather distracting and I am afraid the matter slipped my memory. We had rather an anxious time during the three months of flying bombs and, as you may have noticed in the papers, we are not yet quite free of the nuisance although it has so diminished since our joint occupation of France and Belgium as to give us a considerable tranquillity of mind. So far as I and my family are concerned we have suffered no personal injuries and our house has only had minor damage. A house which we previously lived in and which I still own, about a mile away was made uninhabitable and in this district, which was in "bomb alley" there are many houses which have been damaged. We must have seen hundreds of the missiles flying overhead and some ten or twelve fell within half a mile radius of here so you can appreciate that life was not quite normal."

Du Pont Announces Speaker Changes

Attention is called to the following changes in speakers available from the Du Pont Company. Mr. H. L. Berner replaces Mr. H. H. Blouch in the Detroit territory. Mr. R. O. Hull, formerly available in the Cleveland area is no longer with the company. Mr. R. Blair from the Niagara Falls Laboratory will be available from time to time. Inquiries should be addressed to Mr. F. F. Oplinger, Electroplating Division, Wilmington, Delaware.

John J. Bognar Joins H-VW-M

The Hanson-Van Winkle-Munning Co., Matawan, N. J. announces that John J. Bognar, formerly Chief of the Finishing & Treating Section, Service Equipment Division in the Consumers Hard Goods Bureau of the WPB, Washington, D. C. has joined their organization as a field representative in Chicago. Mr. Bognar will thus be engaged with the electroplating and metal finishing supplies, serving the industry in which he has spent 17 years. His experience in the field has been broad, and at the same time thoroughly practical. He has worked at plating, buffing, shop production, sales and purchasing.

He has the good wishes of a host of friends throughout the industry, for success in his new endeavor.

Donald C. Blum Joins Udylite

Mr. Blum third generation member of a well known Rochester family of electroplaters has been made Udylite's Service Engineer for Buffalo, Rochester area with headquarters at 672 Mt. Read Boulevard, Rochester, N. Y.

Mr. Blum was employed for five years in the electroplating department of Samson United Corporation, Rochester, makers of electrical appliances. He later had charge of plating and metal finishing operations on automotive and war material for a period of six years with Rochester Products.

As Secretary and Treasurer of the Rochester Branch of the American Electroplaters Society for the past two terms, and through his years of active occupation in electroplating, he has acquired a wide acquaintance and respect among the platers in this territory.

HEADQUARTERS

for

Buffs — Cleaners — Buffing Compositions

Nickel Anodes — Chemicals

General Supplies — Equipment

JACOB HAY CO.

(NOT INC.)

4014 WEST PARKER AVENUE CHICAGO, ILL.

NEW Equipment Materials Supplies

Brown Introduces Electric Controls to Electronic Line

Introduction of electric contact controls for circular chart electronic potentiometers is announced by the Brown Instrument Company.

The electric contact controllers will be available in two forms. One will contain a locking-in type relay, designed primarily for electric furnace control. It can also be used for applications involving use of contractors and for processes requiring a differential gap.

The second type, without a relay, is designed for direct control of motorized valves, operation of signalling devices, and for applications requiring a "dead" neutral.

The electric contact control mechanism, according to engineers of the Brown company, Philadelphia precision industrial instrument division of Minneapolis-Honeywell Regulator Company, will be available for circular potentiometer pneumatic controllers. It will serve, when applied to these instruments, as an auxiliary switch for operation of signal lamps and other devices.

New Pennsalt Cleaner

Pennsalt Cleaner EC-10 is a new organic type cleaner produced by the Pennsylvania Salt Manufacturing Company. This metal cleaner employs a new principal, as a result of which it removes soil which alkaline cleaners hardly touch in the short time usually allotted for cleaning. It is especially adapted for the quick removal of drawing compounds or cutting oils in a single operation. The Company has just issued a folder explaining the use of Pennsalt Cleaner EC-10 in both the dip cleaning and spray washing methods of cleaning. It shows pictures of interesting tests demonstrating the stability of the product in emulsion and its quick effectiveness in dip cleaning.

A copy of the descriptive folder on Pennsalt Cleaner EC-10 will be sent without cost or obligation upon request addressed to the Special Chemicals Division, Pennsylvania Salt Manufacturing Company, 1000 Widener Building, Philadelphia 7, Pa.

New Digest on Production Cleaning of Die Castings

An informative, timely 12-page digest entitled "Production Cleaning of Die Castings" has just been released by Oakite Products, Inc., New York 6, N. Y., which, because of the high importance of preliminary preparation of die castings before finishing, should prove of particular interest to all users and commercial producers of die castings.

The digest describes various cleaning techniques and materials for the surface preparation of aluminum, zinc, magnesium, brass, bronze, copper, lead or tin base die castings prior to the application of organic, chemical or electroplated finishes. The data given is based on actual experience in hundreds of plants producing war and civilian supplies. A free copy of this digest may be obtained by writing to Oakite Products, Inc., 40 Thames Street, New York 6, N. Y.

New Catalog of Superior Fluxes

A new catalog describing the complete line of "SUPERIOR" Fluxes is announced by Superior Flux Company, 913 Public Square Building, Cleveland, Ohio. Included in the line are 20 fluxes for welding, brazing, silver soldering, soft soldering and low temperature alloy welding of ferrous and non-ferrous metals and alloys.

Fluxes for silver soldering and similar operations are offered in both paste form and powder form. Different fluxes are available for welding, brazing and soldering all forms and alloys of aluminum. For cast iron and for copper there are both welding and brazing fluxes, and for stainless steel there are welding and soldering fluxes.

For each flux listed there is included a detailed statement of its characteristics and a full schedule of list prices. The catalog is attractively printed in two colors and has been arranged for easy selection of the correct flux for any individual application.

E-Z-Ground Clamp

This clamp is so designed that the current does not travel a great distance in the clamp, thus preventing over-heating. It also gives a quick, positive and portable ground connection, making electrode holder and cable operate cooler, last longer and use less current. This clamp will increase machine and operator efficiency and aid in eliminating arc blow.

For further information write Will-Weld Mfg. Co., 660 S. 15th St., Omaha, Neb. and mention *Monthly Review.*

Green Electric Constructs Mobile Rectifier Unit for Magnetic Testing

An unusual DC power supply problem, presented by outdoor testing of steel propellor shafts, was solved by a custom-built mobile rectifier unit designed and constructed by the W. Green Electric Company at 130 Cedar Street, New York 6, N. Y. This rectifier supplies DC for a "magnetic particle inspection" process which reveals flaws in the propellor shafts.

The Green mobile rectifier unit for magnetic testing is a power supply unit which has a continuous capacity of 1500 amperes DC with proportionately higher rating for intermittent operation. The output voltage is adjustable in eight steps from one to six volts. A fan-cooled selenium rectifier assembly is the heart of the unit. Deep "rain-proof" louvres at each end provide for air intake and exhaust.

DC output terminals on each side, also the control panel, are located in recesses in the cabinet walls. The control panel is equipped with fan starting switch, push buttons for main contactor control, voltage adjustment switch, pilot lamp, visual and audible overload warning signals, voltmeter and ammeter.

Three phase, 440 volt, 25 cycle power supply is brought to the Green unit through a 25 foot cable which plugs into a weatherproof receptacle at one end of the cabinet.

Except for the fan which may be externally lubricated through Alemite fittings, there are no moving parts in the mobile rectifier unit. If inspection is necessary, the entire top of the cabinet can be removed. In addition, the unit is mounted on heavy-duty, rubber-tired, swivel wheels, and sling holes are provided at the four upper corners to permit crane handling.

Bethlehem Steel Company presented the requirements and the complete rectifier unit was designed and built by W. Green Electric Company of New York.

RECOVER SOLVENTS

Recover Solvents and Thinners from Wash, Stripping, and Degreasing Operations by the well-known

LOFGREN PROCESS

Send quart sample of soiled solvent to

CRANE EQUIPMENT & SUPPLY COMPANY
P. O. Box 16
Waterbury 85, Conn.

or

SOLVENTS RECOVERY SERVICE, Inc.
1019 Broad St., NEWARK, N. J.

ELECTROPLATERS

✓CHECK FOR INFORMATION OR WRITE FOR HELP ON PROBLEMS

OUR line of Special Finishes for Electroplaters meets all customary requirements. For detailed information on any of these finishes, merely check the list below, attach to your letterhead and mail.

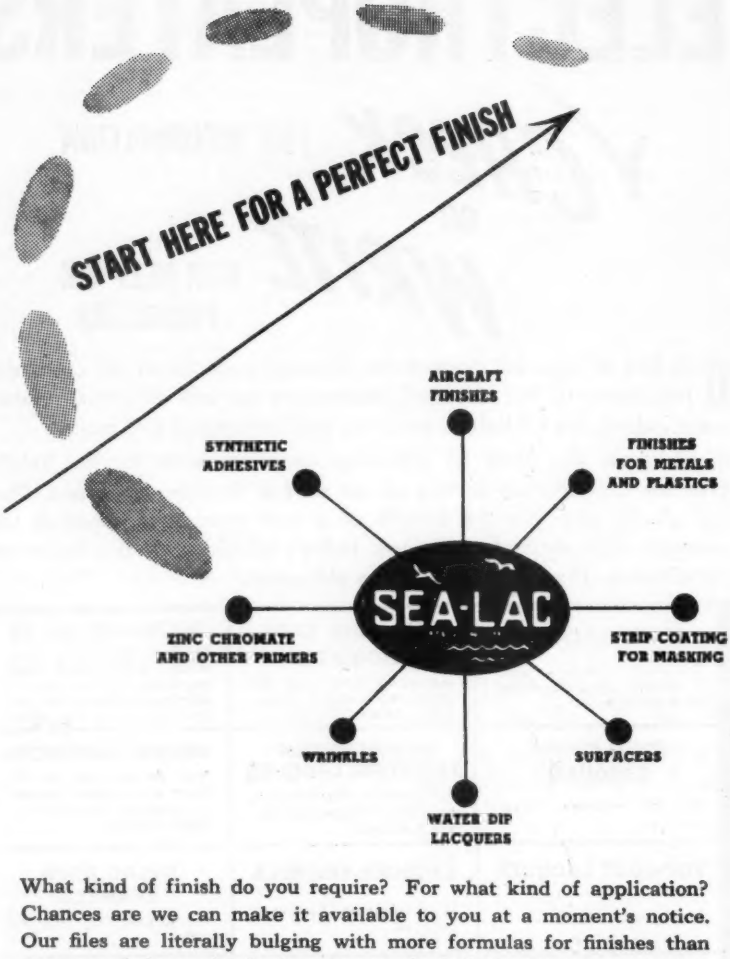
If, however, you have an individual problem, write for the helpful Wartime Consultation Service of our staff of finishing engineers. They will gladly give you the benefit of a vast amount of research into materials and methods to relieve today's problems of shortages and curtailments. There is, of course, no obligation.

CLEAR LACQUER for steel . . silver . . gold . . brass . . copper . . nickel and other metals . . .	**NON-STAIN SPOT LACQUERS** especially developed for protecting coatings of copper . . brass . . silver . . .	**WATER-DIP No. 33** for iron, aluminum, cadmium - plated and other production plated parts . . eliminates fingerprints and staining during assembly.
BURN-PROOF LACQUER for ash receivers, trays, etc. . . .	**PERSPIRATION-RESISTING LACQUER** for pencils, flashlights, and other frequently handled products . . .	**BRONZE LACQUERS** that do not jell or discolor with bronze powder . . produce beautiful metallic finishes . . .
TOP-COAT LACQUER high gloss . . mat . . .	**LACQUER-ENAMELS** in all colors and for every purpose . . .	**DULAC RACK ENAMELS** for protecting plating racks . . .
DULAC STOP-OFF LACQUERS for sectional plating . . .	**CLEAR PRIMERS**	**PLATELUSTRE** a semi-transparent coating that simulates many plated finishes and gives a colored metallic effect.

M&W **MAAS & WALDSTEIN CO., NEWARK, N. J.**

Branch Offices and Warehouses

1658 Carroll Ave., Chicago • 1228 W. Pico Blvd., Los Angeles

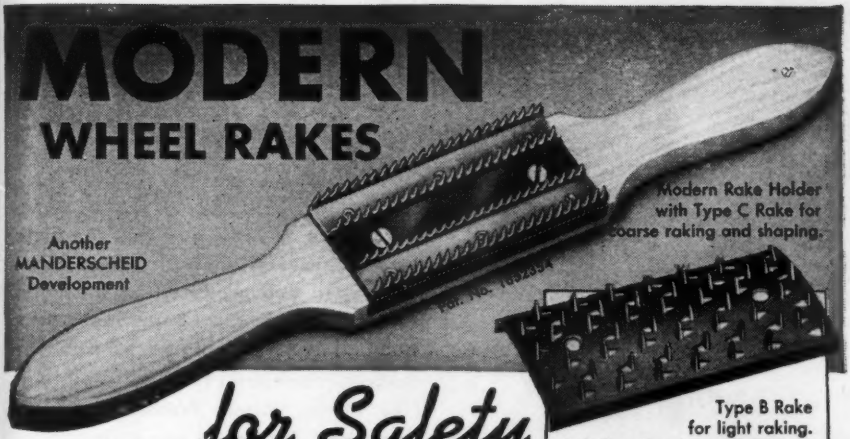


What kind of finish do you require? For what kind of application? Chances are we can make it available to you at a moment's notice. Our files are literally bulging with more formulas for finishes than you can shake a sheaf of specs at. And if the finish you need is non-existent, we'll make it exist—in our laboratory. Either way, you'll get the finish you want, without delay.

DURALAC CHEMICAL CORPORATION

LISTER AVENUE, NEWARK 5, N. J.

MODERN WHEEL RAKES



for Safety

Speed and Economy

Type B Rake for light raking.
Both Type B and Type C Rakes fit the Modern Rake Holder, singly or one on each side. Just replace worn rakes and save the handle.

Presto POLISHING WHEEL BUSHINGS

Modern as **RADAR**

STOP Spindle Wear

Keep Wheels Concentric

Easily pressed into the wheel using a polishing lathe spindle as a screw press.

Another MANDERSCHEID Development

A girl can change Presto-Equipped Polishing Wheels easily, quickly and SAFELY. They slide on and off with the spindle stopped, without hazard to operator or wear to spindle.

The wheels stay concentric — do a better job faster, without wasting grit.

Use Presto Bushings in your present wheels. Specify "Equipped with Presto Bushings" when you order new wheels.

Send for free samples. Give spindle size.

Proper wheel surfaces and correct shapes are essential to efficient polishing, buffing and burring. That's why Modern Wheel Rakes *effect economies beyond estimation!*

Modern Rakes do the job right—*quickly without hazard to operator.* They recondition and shape wheels with minimum waste, *thereby conserving the wheels.*

Observe the many teeth of uniform length and spacing patterned to rake evenly to the correct depth. Note the two rakes—Type B for light raking, Type C for coarse raking and shaping—*both interchangeable on the Modern Rake Holder,* affording the *right tool* for the job in a jiffy.

Whether it's *trimming polishing wheels,—raking out buffing wheels,*—or *shaping any kind or size* of Polishing Wheel, Buffing Wheel, or Bob, Modern Rakes *do the job so much better there's no comparison.* The *extra Safety alone* makes Modern Rakes worth *many times* their modest cost.

Jobbers in principal cities.

The MANDERSCHEID *Co.*

605 West Washington St., Chicago 6, Illinois

Serving the Metal Finishing Trade over 35 Years.

NOW AN *Extruded* MASKING TAPE

★ FOR THE INSULATION OF PLATING RACKS

★ FOR MASKING PARTS PRIOR TO SELECTIVE PLATING

Miccrotape rounds out the complete line of protective coating materials developed and produced by Michigan Chrome and Chemical Company for the insulation of plating racks and for masking parts prior to selective plating. Like other "Miccro Products" it was developed for use in our own plating plant . . . to provide qualities offered by no other tape used for similar purposes.

Miccrotape is the first tape of its kind to be produced by an extruding process. This results in a slightly curved surface which feathers out to uniformly light edges. This feature makes Miccrotape extremely easy to apply and permits unusually smooth over-lapping and a snug fit around every surface.

You'll be interested in the many other outstanding features of this tape and its unusual advantages for use on specific types of work. Full details will be sent you upon request.

MICCROTAPE

Developed and Manufactured by Experienced Platers

MICHIGAN CHROME & CHEMICAL CO.

6344 EAST JEFFERSON • DETROIT 7, MICHIGAN

Scoop Competition WITH UNICHROME* Alkaline Copper

THE PROCESS THAT STEPS UP PLATING OUTPUT OI SMOOTH, DUCTILE DEPOSITS

re's far more than wartime usefulness to Uni-me Alkaline Copper. Many plants are installing output-boosting process today with a canny eye ivilian applications. They know that the greater d and efficiency of this process . . . its money g features . . . will give them the inside track post-war competition. Here are the production ntages of Unichrome Alkaline Copper that it consideration by any plant doing copper ing now, or planning to *after Victory.*

ichrome Copper deposits are exceptionally ooth and lustrous . . . provide an excellent base bright nickel without buffing. When plating over gh base metal, buffing is done in less time, using pressure and fewer materials.

many plants today this process boosts production use of the excellent plating speeds obtained. from scum, the deposit needs no activation be-subsequent plating. Ordinary cleaning cycles are adequate for use with Unichrome Copper

Heating requirements and heat losses are lessene in the moderate temperature bath—100° to 140°I Bath is stable, has a wide operating range, is free rinsing and doesn't deteriorate or build up wit carbonate. It's easier on stop-off materials toc 100% anode and cathode efficiency. The solutio contains no cyanide, is non-toxic, won't attack cloth ing or equipment. Your existing facilities can b easily converted for use with this process.

Send for this Descriptive Leaflet

It gives all the advantages of Unichrome Alkaline Copper . . . as well as characteristics . . . plating speed tables . . . important technical data. Kindly outline your needs to assist us in answering more fully.

☆Reg. U. S. Pat. Off.

THER U. C. PRODUCTS AND PROCESSES TO SERVE YOU

ROMIUM PLATING for wear-resist-, oil-retaining and other types of ishes.

OZINC for anodic treatment of zinc ving greatly increased corrosion-re-tance and an attractive black or low finish.

ICHROME STRIP for speedy removal copper, chromium, zinc, etc., from el and cast iron without etching the se.

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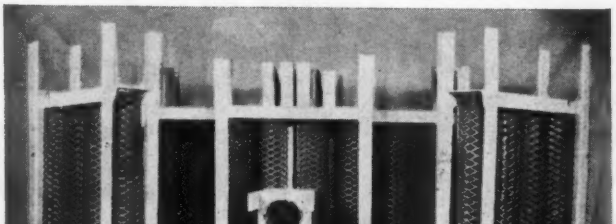

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BRIDGEPORT BRANCH

The regular monthly meeting of the Bridgeport Branch of the American Electroplaters' Society was held Friday, Nov. 3, 1944 at the Hotel Barnum. President A. R. McNeil opened the meeting at 8:30 P.M. with 24 members and guests present including John English and Jack Buckman from the New Haven Branch, H. M. Johnquest from the Waterbury Branch and our esteemed friend, George B. Hogaboom, who dropped in for a brief visit.

The roll call of officers was read and the Board of Managers, R. J. O'Connor and William Thompson, were reported absent. The minutes of the previous meeting were read and accepted.

The Publicity Committee reports good progress in reporting our meetings to the public at large.

The Projector Committee has no report to make at this time.

F. B. Gotthardt, Librarian and Chairman of the Technical Sessions Committee reported that H. M. Goldman will speak at the Nov. 3 Business Meeting on "Chrome Plating."

Also, an open meeting is scheduled for Friday, Nov. 17, 1944 at 8:00 P.M. with Mr. Ed H. Bucy speaking on "A Look at Some Post-War Qualities of Organic Finishes" at the Hotel Barnum. Everyone was asked to plan to attend because of educational interest.

Communications:

A letter from George Wagner, Secretary of the Newark Branch, stating that a package was sent to us containing the 1944 year books of the Newark Branch and sends his regards to all the members of the Bridgeport Branch. These books were promptly given to the members and all were greatly pleased. The Bridgeport Branch thanks the Newark Branch for these fine books.

A letter from Albert J. Strauss, 8 Argyle Road, Upper Montclair, New Jersey, requesting a transfer to the Hartford Branch A.E.S. The secretary was ordered to make the necessary arrangements to grant this transfer.

A letter from Jack Bain, our Publisher, giving us a very fine memorandum and calling specific attention to the November issue of *The Monthly Review*. It certainly deserves our consideration, loyalty and pride to help keep our publication at the top notch. The letter was ordered to be placed on file.

A letter from the Kemper-Thomas Co., Cincinnati, Ohio, was ordered to be placed on file.

A letter from the Cleveland Branch A.E.S. giving their report of the estimated and actual budget for the Cleveland 1944 Convention was ordered to be placed on file.

A letter from George Karl thanking the members of the Branch for the basket of fruit sent to him during his recent illness.

A letter from President A. J. Maz, Waterbury Branch A.E.S. to President A. R. McNeil, Bridgeport Branch A.E.S. asking the members of the Bridgeport Branch to vote on the following:

The Regional Fund is to be governed by the following rules:

1. Money made at Regional Meetings is to be turned over to a Regional Fund until we accumulate $1,000.
2. When this Fund reaches $1,000, the excess profits are to be divided equally among the five Branches; namely, Hartford, Waterbury, New Haven, Bridgeport, and Springfield.
3. If a Branch desires to withdraw from the New England Regional Meeting Group, it will receive one fifth (1/5) of the money in the Fund. A Branch may withdraw from this group whenever it sees fit.
4. If another Branch desires to join the New England Group, it must deposit an amount of money equal to the proportionate amount each Branch has in the total fund.

After a thorough discussion, the Bridgeport Branch has voted for the Permanent Regional Fund and its rules providing the a number five (5) group to be inserted as follows:

5. The money of the Permanent Regional Fund shall not be spent for any other purpose, only and namely for the New England Regional Meetings.

The secretary was ordered to write A. J. Maz, President of the Waterbury Branch A.E.S. to this effect.

In reference to the letter received from George Karl wishing to resign after a long service and membership in the American Electroplaters' Society, the Bridgeport Branch members voted that he could not resign, either by choice or request, and therefore, was unanimously elected as an Honorary Member of the Bridgeport Branch. Congratulations and Best Wishes to you, George, from all of the members.

President A. R. McNeil turned the meeting over to Librarian F. B. Gotthardt, who spoke briefly on the arrangements made to have one Branch member speak at each Business Meeting. He called on H. M. Goldman, our 2nd Vice-President as speaker, who spoke on "Chromium Plating." A discussion followed this fine talk which proved interesting and educational to all of the members present.

After the meeting refreshments were served which were enjoyed by all of the members present.

Meeting adjourned at 11:00 P.M.

JOSEPH G. STERLING, *Secretary-Treasurer*

TORONTO BRANCH

The November meeting of The Toronto Branch A.E.S. was held in Banquet Hall "C" of the Royal York Hotel, on November 17th at 8:00 p.m.

The meeting was preceded by a dinner with Mr. Frank Mesle as the guest of honor. Refreshments before the dinner were provided by Jack (Cisco) Acheson of the Canadian Hanson & Van Winkle Company, who attended incognito, wearing colored glasses. (A distinct improvement).

After the dinner, Mr. Byers took the chair and called the meeting to order.

Two applications for membership were received and Miller M. Anderson of the Coleman Lamp Company, and Lloyd S. Williams of the Canadian Hanson & Van Winkle Company were elected to membership.

After the regular order of business, Mr. Byers invited Mr. Mesle to say a few words relative to the current campaign in aid of "The Research Fund." The members did not require much persuasion, as we all appreciate the fine work our committee carries on. The sum of $125.00 was appropriated for this purpose.

Mr. Mesle then gave a short review of his Company's work with heavy deposits of silver, showing samples, graphs and pictures relative to their process. After answering numerous questions pertaining to silver, Mr. Mesle was voted a very hearty round of applause.

Our annual Quiz Program took up the balance of the evening with all members joining in enthusiastic competition for the various prizes. Mr. Byers thanked the committee for their work on the program and the meeting closed at 11 p.m.

THOMAS BOAZ, *Recording Secretary*

MILWAUKEE BRANCH

The Milwaukee Branch held its regular monthly meeting on Friday, October 6th, in the Guild Hall of the Republican Hotel. President Robert Steuernagel, Jr. opened the meeting.

Mr. Steuernagel appointed Mr. Axel Johnson and Mr. Walter Weise as a membership committee. After a short business session the meeting was turned over to Mr. William Geissman who introduced Mr. L. Appeler of the Vapor Blasting Company who spoke on the advantages of vapor blasting. Vapor blasting is, as its name implies, blasting by water vapor and an abrasive mixture. The mixture under pressure can produce a surface ideal for piston cylinders and walls where an easily wet surface is important. The removal of scale where tolerances are small is another advantage of this process. Mr. Appeler showed slides of surfaces before and after vapor blasting and told of many applications of the process in the field of plating. As a surface preparer prior to porous chromium, it has distinct superiority over other methods of preparing cast iron. Also honing after plating with vapor blasting left a better surface than ordinary honing. Mr. Appeler spent considerable time answering questions which showed the enthusiasm of the large group. Those who could not be present at the meeting missed a new process that might be the answer to that old problem.

The meeting adjourned with many remaining for more discussion.

JAMES DURNFORD, *Secretary*

JACKSON-LANSING BRANCH

The October meeting of the Jackson-Lansing Branch was held at the Hotel

Hayes in Jackson, October 10th. Approximately one hundred enjoyed a fine turkey dinner.

A.E.S. members from other branches included four from Detroit, three from Grand Rapids, and one from Los Angeles. The guest from the Los Angeles branch was Lt. F. A. Maurer, Air Corps, Central Procurement District, stationed at Detroit, Michigan.

After the dinner, a short business meeting was held.

The speaker for the evening was Mr. F. W. Hampson of the Plating Process Corp., Holyoke, Mass. Mr. Hampson discussed "Electronics in the Plating Industry," which included a demonstration of equipment to provide automatic temperature and level control for plating and processing solutions.

After the talk, motion pictures of the A.E.S. convention and a film entitled "How Good is a Gun" were shown.

C. E. TOPPING, *Secretary and Treasurer*

CHICAGO BRANCH

The Chicago Branch held its regular monthly meeting on November 10th with President R. J. Hazucha presiding.

Applications were received from F. Lavitas, H. Cain and J. Koley.

M. J. Zunick, G. E. Malohn, L. G. Swanson, C. E. Fowler, W. J. Nako, J. M. Andrus and E. A. Anderson were elected to membership.

J. W. Hanlon, Chairman of the Banquet Committee, reported that the banquet will be held on the 27th of January at the Palmer House. Tables will be reserved.

Frank Savage reported on the Research Program and the Branch will take action on it at the December meeting.

Our Librarian C. W. Carter introduced J. M. Boudreau who talked on "Plastics Plating." The talk was very interesting and instructive. Mr. Boudreau was given a rising vote of thanks after a lengthy discussion.

The meeting adjourned at 10:30 P.M.

M. H. LONGFIELD, *Secretary*

LANCASTER BRANCH

The Lancaster Branch of the A.E.S. held its November meeting in Harrisburg at the Charles E. Snyder & Sons Co. Plating Works. There were 40 members and guests present.

The application of Harry Brenner to be admitted as an active member was approved and he was elected a member.

The business of the Branch was rapidly conducted and the Branch President introduced Dr. Blum of the National Bureau of Standards. Dr. Blum brought greetings from the Baltimore-Washington Branch and extended us an invitation to attend their meetings. He then proceeded to outline the program layed out by the Research committee, citing the three problems chosen to start work on and the proposed method of approach. Dr. Blum concluded with the statement that it was felt each Branch should contribute at least $1.00 per member toward this program and that a committee be appointed to approach the job shops for contributions.

The executive committee of Lancaster Branch voted to send a check for $50.00 to the Research Fund.

The librarian then introduced Mr. Harold Narcus, the speaker, from the Plating Processes Co., Holyoke, Mass., who spoke on "The Deposition of Metallic Coatings on Plastics." Mr. Narcus opened his talk by citing the importance of plastics to the plater and the value of plating on plastics. He then classified plastics into three groups as follows: (1) Synthetic resins, (2) Natural resins and (3) Protein derivatives.

These groups were then subdivided into the thermoplastic and thermosetting types and examples of each given.

Mr. Narcus spoke on the value of plastics in the war effort such as the substitution for critical metals and the combination of plastic properties with metallic properties and the advantages that can be obtained by substitution and combination.

The various methods for applying metallic coatings to metals were outlined as follows:

1. Varnish or wax with a conducting powder.
2. Metal Spray.
3. Cathode Sputtering.
4. Metal Vaporization.
5. Reduction methods.

Mr. Narcus outlined each method and stated the advantages and disadvantages of each method with the statement that the reduction method was probably the most used and easiest to use. He then listed a typical procedure for plating on plastic materials.

WILLIAM H. FORDNEY, *Sec'y-Treas.*

NEWARK BRANCH

The regular meeting of the Newark Branch, A.E.S., was held on Friday evening, November 3, 1944 at the Hotel Robert Treat, Newark, N. J. The meeting was called to order at 8:15 P.M. with President Robert R. Sizelove pre-

siding. All other officers were present.

The reading of the minutes of the previous meeting was dispensed with.

A communication from Carl Heusner, Chairman of the newly organized Research Committee, was read and discussed and upon motion duly made and seconded it was voted that Newark Branch donate $1.00 per member, in good standing, to the Research Fund. The Secretary was requested to check the membership list and present the list and the check at our next meeting. Our President Mr. Sizelove appointed our Educational Committee to consider problems to be forwarded to the Research Committee.

A communication and an accompanying list of speakers from Walter L. Pinner was read and the list was turned over to our Librarian Edward Washburn.

A communication from our Business Manager, Mr. Jack Bain, was read and placed on file.

Communications from Columbia University and Appollo Metal Works, thanking Newark Branch for the Year Book, were read and placed on file.

Applications for Russel K. Johnston, Curtiss-Wright Propellor Division; Fred Eidel, Wright Aeronautical Corporation and James L. Hosking, Aircraft Radio Corporation were voted to take the regular course.

The resignation of Marvin A. Schwartz was accepted.

Mr. Horace H. Smith reported that he and Mr. George Wagner attended a meeting of all the Chairmen and Secretaries of the various Technical Societies of New Jersey on Monday, October 30th, at the Essex House, Newark, N. J. This meeting was called by Dr. Skowronski, Chairman of the American Society for Metals, New Jersey Chapter. The purpose of the meeting was to call together all the Chairmen and Secretaries of the various technical soc'eties of North Jersey, to talk over the possibilities of forming an organization or council for the purpose of mutual aid and co-operation between the different societies. At this meeting it was suggested that we follow the plan of the Pittsburgh organization by sending bulletins of all scheduled meetings of the combined societies to the Secretaries of the various societies for distribution among their members. Mr. Wagner, Secretary Newark Branch, A.E.S., was asked to obtain quotations for printing 6,000 sheets similar to the Pittsburgh Technical Calendar of which he was handed a copy. The representatives of the various societies were asked to ascertain from their organizations to what extent they would support an organization such as this. It was also decided that another meeting of this group should be held sometime in December.

Mr. Smith reported that the final arrangements for the Christmas Party to be held on December 16th at the Hotel Robert Treat would be made at a committee meeting on Monday, November 3rd and that full details would be ready at our next meeting.

The guest speaker for the evening was Mr. Frank T. Mann of Ranschoff, Inc., Cincinnati, Ohio. His subject was "Barrel Finishing Equipment" which proved to be a very interesting subject. His talk was accompanied by stereoptican slides. Mr. Mann was asked numerous questions and was given a rising vote of thanks by the 44 members who attended this meeting. Meeting adjourned at 11 P.M.

GEORGE WAGNER, *Secretary*

PITTSBURGH BRANCH

The regular meeting of the Pittsburgh Branch was held Thursday, November 2nd, at the Roosevelt Hotel.

Dinner was served at 6:30 P.M. to thirty-two members and friends.

Dr. D. F. Siddall of the U. S. Stoneware Company gave a talk on "Effective Corrosion Control" immediately after the dinner. His talk, together with moving pictures described corrosion and how it was effectively combated by ceramics, plastics and lead. An interesting discussion following his talk was evidence of the interest of the group in this subject.

The business meeting followed the discussion. Minutes of the previous meeting were read and approved.

Five new members were elected into the Branch and six new applications were received.

President Johnston appointed the following as the research committee from the Pittsburgh Branch: G. A. Jersey, Chairman; L. E. Lancy; D. W. Stoner.

An intense discussion of the financial proposition of the National Research Committee brought out that Pittsburgh Branch desires to do its share. The question was raised if the associate members should be obligated to the same extent as the active members for such special funds. No decision having been made the discussion was tabled for another month.

A Christmas party was discussed, but the idea was finally rejected because of the December meeting having been already planned.

A moving picture on magnesium called "From Sea Water to Magnesium" was shown and the meeting was adjourned at 11:30 P.M.

FRANK R. KELLER, *Secretary*

WATERBURY BRANCH

Waterbury Branch held its regular meeting at the Hotel Elton on Friday, November 10th. The technical session opened at 8 P.M., and as usual was preceded by dinner in the Colonial Room. In the absence of our President, Tony Maz, Vice President W. L. Cassell presided. We were all sorry to learn that Tony was kept at home due to the severe illness of Mrs. Maz. The entire Branch wish for her speedy and complete recovery.

At the preceeding business meeting Waterbury Branch accepted the proposal to establish a Regional Meeting Fund up to $1000, the money to be procured from the profits of each regional meeting. It still remains for the other four interested Branches to accept this proposal.

At this same business meeting, Bill Starr was appointed chairman of a committee to solicit funds from manufacturers and job platers to be applied to the research work of the Society. Ellsworth Candee reported that this research program is now starting actively, two fellowships already being established at two colleges. The first fellowship is to determine the effect of small quantities of addition agents on electrodeposits, while the second is to determine the best methods of stripping copper from steel. These are both short-time projects and the research committee is now concerned with the establishment of a major research program. Members are requested to offer suggestions on subjects requiring investigation, which will be beneficial to the entire industry.

The business meeting having been concluded, the program for the evening was turned over to the Technical Chairman, Merle M. Wetzel, who asked Jack Hyner to review the reprint of the paper "Devices for Controlling Distribution of Electrodeposits" by C. J. Leadbeater, which is to be published in Volume 19 of the "Journal of the Electrodepositors Technical Society." The author covers very completely and very clearly various means of obtaining uniform current distribution in electrodeposition, and every one who is concerned with obtaining uniform plating on irregular pieces will find the paper very helpful.

Bill Starr had nothing new to report on the subject of priorities for during the past month or two, few changes have taken place that affect electroplaters.

"Synthetic and Engineered Corrosion Control" was the subject of a talk by Mr. Donald F. Siddall, Director of Research of the U. S. Stoneware Co. His talk was illustrated by three very interesting motion pictures in color, covering the manufacture of the new synthetic corrosion resistant material "Tygon," the new chemical stoneware "Ceratherm 500" and the methods used in making "Homogeneous Lead Linings" for various types of tanks and apparatus. Mr. Siddall summarized in his paper the types of material from a chemical viewpoint, which might be useful in combating corrosion. In the subsequent question period he elaborated on methods of application and types and kinds of plastic resins useful in the electroplating field for tank and equipment lining. His talk gave us an insight into some of the newer materials which are now being used so successfully to protect equipment against corrosion by various acids and alkalis. The members all appreciated having the opportunity of hearing this talk, which should be of great assistance to everyone.

S. L. HENN, *Secretary*

PHILADELPHIA BRANCH

On the 4th Friday of October, President Zurbach called the Branch meeting to order with all officers present except 2nd Vice-President L. T. Burden.

The minutes of the previous meeting were approved as read.

Several communications were read and discussed.

The applications of Julius Kronrad and Louis Thaler, associates, were read and turned over to the Board of Managers.

After approval by the Board of Managers, Samuel Garretano, and Charles W. Parker, Actives, were elected to membership and the transfer, from Pittsburgh Branch, of L. A. Reisman, associate, was accepted.

The President appointed 1st Vice-President Henry G. Orlik as chairman of the Philadelphia Branch Research Committee.

Motion—The Chairman of the Research Committee to appoint his own committee. Carried.

Motion—The Entertainment Committee to make arrangements for a testimonial dinner to George Gehling. Carried with December 8th as date.

President Zurbach turned the gavel over to Librarian Hirsch, who introduced the speaker of the evening, Dr. Siddall, Director of Research, U. S. Stoneware Co., Akron, Ohio., whose subject was "Synthetics and Engineered Corrosion Control."

The speaker gave quite a lengthy talk on the research methods pursued in relation to synthetics and the electroplating industry, along with the films shown made quite an educational session, and was greatly appreciated by those present.

Dr. Siddall received a rising vote of thanks.

The bills were ordered paid and the meeting adjourned at a late hour.

PAUL MENTZER, SR., *Secretary*

SYRACUSE BRANCH

The Syracuse Branch of the A.E.S. had its regular monthly meeting on Friday, November 10, in Bowne Hall, Syracuse University at 8:00 p.m.

The meeting was called to order by President Murphy, and the minutes of the previous meeting were read and accepted. A letter from Mr. Jack Bain, describing progress made by *The Monthly Review*, was read by the secretary.

President Murphy made a report on the activities of the research committee. He announced the appointment of D. M. Overcash, George Simmons, Austin Fletcher and Irving A. Psyck as members of the committee. Dr. Murphy further reported that all four members had filled in the questionaires sent by the Research Committee of the Supreme Society and had made other recommendations. It was announced that the material presented should be coordinated and a report made on the committee's recommendations at our next meeting.

Following this report, Dr. Murphy introduced Mr. Frank C. Mesle, representing the Research Committee of the Supreme Society. Mr. Mesle outlined very clearly the aims of the research committee, the nature of the problems, the method by which the program was to be carried out, and the contemplated method to be used for financing the program. Mr. Mesle stressed the desirability of having the organization itself make a sizeable contribution to the program.

Mr. Mesles' talk was followed by a discussion concerning the method by which the Syracuse Branch should make its contribution to the fund. As a result, the motion was made, seconded and carried unanimously that the Syracuse Branch contribute $100 to support the activities of the Research Committee.

Mr. Walter Helbig of Darco Corporation was the speaker of the evening. Mr. Helbig outlined the role of activated carbon in the clarification and purification of plating solutions. The method by which the carbon is made, something of the physical properties of the carbon, and its behavior with respect to organic impurities in the plating bath, were outlined in a clear and interesting manner. Suggestions and recommendations were made by the speaker concerning the amount of carbon to be used, the proper method of handling, and procedure to be observed in treating plating solutions. Mr. Helbig followed his talk with an interesting demonstration, using a filter, a crock full of water, some red ink and activated carbon to demonstrate the method of handling the carbon and to show the absorptive properties of the carbon.

NEIL C. MAFFEI, *Secretary-Treasurer*

SPRINGFIELD BRANCH

The September meeting of the Springfield Branch, American Electroplaters Society was held at the Hotel Charles, Springfield, Mass., on September 25, 1944. The meeting was called to order at 8:15 p.m. by President Hastie. The minutes of the May meeting were read and approved.

The following applicants were voted in as associate members, they are: Raymond P. Senecal, 208 Porter Road, East Longmeadow, Mass. and William A. Pyne, 349 King St., Springfield, Mass. There was one applicant for associate membership: Daniel J. Clini, 30 Belmont Ave., Springfield, Mass. A motion was made, seconded and passed that his name be placed on file until the October meeting.

The Secretary gave a report of the status of the membership in regard to dues. A motion was made, seconded

and passed that 19 members be sent notices and that 9 members be sent letters in regard to being in arrears in their dues.

The business session being complete, Librarian Frank J. Clark then introduced Mr. George B. Hogaboom, Consultant of the Hanson-Van Winkle-Munning Co. who spoke on: "What Specifications Has Taught Us About Electroplating."

The main theme of Mr. Hogaboom's talk was that in general platers fail to meet specifications because they lack knowledge of the condition of the base metal on which they are plating. Drawing from the wealth of experience and background which he is fortunate to possess, Mr. Hogaboom gave a very interesting and informative talk.

After a short question period the speaker was given a rising vote of thanks.

The meeting adjourned at 10:15 P.M.

PAUL F. LYMAN, *Secretary-Treasurer*

TOLEDO BRANCH

A regular meeting of the Toledo branch of the A.E.S. was held at the office of the Vic Miner Co., Toledo, Ohio, Oct. 5th, 1944.

The meeting was called to order at 8:30 o'clock P.M. by the President, Mr. Allison with 30 members and 10 guests present. At the suggestion of the chair every one present introduced himself by standing and giving his name and company affiliation.

Minutes of the previous meeting were approved as read.

A letter from the research committee was read and discussed. Mr. Jones of Detroit, Mich., gave a short talk concerning the aims of the research committee, and gave several suggestions as to how the branch as well as each individual member could support this organization.

The following members were appointed on the research committee for the Toledo branch: Mr. Charles Vannorsdall, Mr. Joe DiSalle and Mr. John Hilfinger, Mr. Vannorsdall to act as chairman of the committee.

At this point there was a 15 minute discussion on the subject of manpower as it pertained to the plating industry in the Toledo district.

At the end of this discussion the meeting was turned over to Mr. Vannorsdall who gave a very interesting lecture on the various types of bright copper solutions, and H. V. W. M. bright alloy plate. He also plated several samples in the different solutions. At the conclusion of his talk Mr. Vannorsdall spent about an hour answering the many questions asked by the interested members. Thanks to Mr. Vannorsdall, and the Vic. Miner Co. for a very good educational program. Members of the Toledo branch are eagerly looking forward to more meetings of this type.

The following applications were received for membership in the Toledo Branch: James M. McKaig, R. 9, Box 700, Toledo, Ohio; Ronald W. Bechtel, Vic. Miner Co., Toledo, Ohio; Wm. Fair, Vic. Miner Co., Toledo, Ohio.

Meeting adjourned at 11:00 o'clock P.M.

G. P. H. BERGEMAN, *Secretary*

NEWARK BRANCH

The regular meeting of the Newark Branch, A.E.S., was held on Friday evening, September 15, 1944 at the Hotel Robert Treat in Newark, N. J. The meeting was called to order at 8:30 P.M. with President Robert R. Sizelove, presiding. All other officers were present.

The minutes of the previous meeting were read and approved.

William D. Wilson, Curtiss-Wright Corp., Robert Charles Kuster, General Chemical Co., and Robert A. Ehrhardt, Bell Telephone Laboratories were elected to Associate Membership. George E. Miller was elected to Active Membership.

Ed Washburn, Paul Oldham and George Wagner reported on the progress of the Year Book. Horace Smith announced that arrangements were being made for our Annual Christmas Party, Dec. 16, 1944.

Our guest speaker for the evening was one of our own members, Mr. Urban A. Mullin who gave a very interesting paper entitled "Silver, Lead and Indium Plating Aircraft Bearings." He exhibited numerous samples which had been plated with the above metals. The discussion on this paper lasted for approximately a half-hour and Urban was obliged to answer all kinds of questions. The paper was turned over to the Secretary for publication in the *Monthly Review*. Mr. Mullin was given a rising vote of thanks by the 47 members attended.

Meeting adjourned at 11:15 P.M.

GEORGE WAGNER, *Secretary*

NEW HAVEN BRANCH

The New Haven Branch held their regular monthly meeting on October 17, 1944 in the Sterling Laboratory of Yale University.

The meeting opened with the showing of a war sound film, entitled "Attack Signal."

President Lynch announced there would be a short business meeting and read the list of the following committees for the coming year.

Sick Committee: John W. English, William F. Bridgett, George A. Tracchio.

Good Fellowship Committee: Henry J. Creamer, Joseph T. Sullivan, Jess W. Whitney.

Research Committee: John C. Oberender, Henry J. Creamer, Joseph M. Cooke, Joseph T. Sullivan.

Membership Committee: George Knecht did such a fine job last year he was asked to head the committee again this year.

A letter from C. E. Heussner, Chairman Research Committee, A.E.S., was read and Ellsworth T. Candee, our Executive Secretary, explained to the members the views of the Research Committee for the coming year.

The Branch wish to extend their thanks to Mr. Candee for attending and participating in our meetings.

Mr. B. G. Daw, President of LaSalco, Inc., St. Louis, Mo., spoke to the members on "The Mechanics of Barrel Plating." Mr. Daw has had many years experience in the engineering and construction of barrel plating apparatus and is extremely well qualified to talk on this subject. The speaker, using slides, showed the action of the work during plating; different diameters and capacities of barrels and the various actions caused by both. This popular subject held the attention of every plater present and many questions were asked of and answered by Mr. Daw who did such splendid work in the production of these films. The members showed their appreciation by giving him a rising vote of thanks.

The meeting adjourned at 11 P.M.

B. J. GAFFNEY, *Secretary*

CLEVELAND BRANCH

The third monthly meeting of the Cleveland Branch was held on November 3rd, 1944 at Hotel Cleveland. The speaker of the evening was R. R. Bair of E. I. du Pont, who gave a very interesting talk on "Zinc Plating." His talk was illustrated with slides of the common variables encountered in plating zinc. He proposed the following improved zinc bath:

Zinc Cyanide	12 oz./gal.
Sodium Cyanide	7½ oz./gal.
Sodium Hydroxide	16-20 oz./gal.
Total Cyanide to Metal Ratio—	2.6 to 1
Sodium Sulfite	1/15 oz./gal.
Current Density—	10-150 amp./ft. sq.
Room Temperature to 110° F.	

For best results, it is necessary to pick an addition agent to fit the particular job being plated. In all of their work they have used no agitation. Agitation seems of questionable value. High metal, and high caustic favor bright deposits. Caustic increases the throwing power. Temperatures higher than 110° F. increase carbonate concentration too rapidly.

After a period of questions and answers, Mr. Bair was given a rising vote of thanks for his interesting paper.

The business meeting was then called to order by our President Mr. George Svenson. The minutes of the previous meeting were read and approved, also the treasurer's report.

Two applications for membership were read and referred to the Board of Managers, also two transfers. There was considerable discussion among the members in connection with the afternoon educational session and evening banquet to be held in February.

The Committee for the research program gave its report, and the following resolution was voted as acceptable:

"The Cleveland Branch will support a well planned research program which is divided into two parts, (1) short range research problems to contribute scientific information on present day plating problems, and (2) long range research projects to advance the science of electroplating.

The Branch will table the matter for a period of three months while the Research Committee of the National Society is formulating and publicizing its research program."

A letter from Mr. Jack Bain was read.

The meeting adjourned at 10:30 P.M.

HARVEY P. HEIL, *Secretary*

BOSTON BRANCH

Boston branch met Thursday, Nov. 2nd, at the Statler Hotel, Boston, with President Swift in the chair.

Minutes of the previous meeting read and approved.

Communications read one from the editor of the *Review* in regards to the advertising each month, to favor whenever possible the advertisers with their purchases. Bills were read and ordered paid.

Four applications were approved by the Board of Managers and elected to membership: Anthony Sgro, 236 Paris Street, E. Boston, Mass., active; Frank Lorusso, 809 Franklin Street, Worcester, Mass., Associate; Robert Blair, 27 Faulkner Street, Malden, Mass., associate, and John S. Antonuccio, 236 Paris Street, E. Boston, Mass., active.

Robert Sizelove, President of Newark branch was in Boston on business and spoke on the research fund. He explained the work that is and will be done by the fund that is to be raised for the benefit of the A.E.S. and all those interested in the plating industry. He asked that a committee of three be appointed to solicit funds from all plating shops.

The chair appointed Arthur W. Collins, Edmund Jevely, and Walter Larsson to this committee, and Boston branch moved that $100 be sent to the research fund.

This being the 25th anniversary of Boston branch, the Chair appointed Robert Magnuson chairman, to make arrangements for the annual banquet and Leonard Chesworth will be the educational chairman.

Color movies of the Cleveland convention were shown with the compliments of the Lea Mfg. Co.

Myron Diggin of the Hanson-Van Winkle-Munning Co. was the speaker. His subject was "Bright Alloy Plating." His talk drew one of the largest attendence in a long time. He showed samples of different parts covered all over. He explained of the working of this solution the throwing power is very good. Samples were passed around for the members to look over. He answered all questions and there were plenty for the members. A report will be sent later.

A rising vote of thanks was given Mr. Diggin for his very interesting talk.

Meeting adjourned at 10:30 P.M.

A. W. GARRETT, *Secretary*

BRIDGEPORT BRANCH

The regular monthly meeting of the Bridgeport Branch of the American Electroplaters' Society was held Friday, Oct. 6, 1944 at the Hotel Barnum. Vice President Herman C. Braun opened the meeting at 8:30 P.M. with 21 members present.

The roll call of officers was read and 2nd Vice President H. M. Goldman, Sergeant at Arms L. F. Griffin and Board of Managers R. J. O'Connor and B. F. Kusterer were reported absent. The minutes of the previous meeting were read and accepted.

Reports of Special Committees

Regional meeting committee had no report to offer at this time. It was decided to bring this up under the heading of unfinished business at the next meeting.

Reports of Standing Committees

Membership Committee reported that four men are to be elected to membership and that further progress is being made for application to membership.

The Sick Committee reported that Mr. and Mrs. George Karl and B. F. Kusterer are on the sick list. J. G. Sterling and F. B. Gotthardt were delegated to visit the above mentioned convalescents.

The Publicity Committee reports good progress in reporting our meetings to the public at large.

The Projector Committee has no report to make at this time.

F. B. Gotthardt, Librarian and Chairman of the Technical Sessions Committee reported that V. Consalvo will speak at the October 6th Business Meeting on "Training of the Novice in the Plating Room."

Also an Open Meeting is scheduled Friday, October 20, 1944 at 8:00 P.M. with Mr. Fritz Uhlenhaut speaking on "Infra Red—A New Industrial Tool" at the Barnum Hotel. Everyone was asked to plan to attend because of educational interest.

Communications

A letter from George Karl submitting his resignation with no reason given. It was decided to bring this matter up under the heading of Unfinished Business at the next meeting.

A letter from Eugene P. Schimmel requesting a change of status from Asso-

ciate to Active Membership. The Branch has agreed to this change of status based on its findings and in conformity to the Constitution.

A letter from the Metal Finishing Publication offering to publish news of the meetings and social affairs of the Bridgeport Branch A. E. S. The Branch ordered the secretary to write to E. T. Candee, Editor and Executive Secretary of the A. E. S. for information regarding this matter.

A letter from Executive Secretary E. T. Candee regarding a questionnaire for submission of problems to the A.E.S. Research Committee by the Members, through their respective branches was ordered placed on file.

A letter from The United Community and War Fund was ordered to be placed on file.

A letter from C. E. Heussner, chairman of the Research Committee A.E.S. was ordered to be placed on file.

A letter from Frank Savage, 2nd Vice President A.E.S., pertaining to getting new members to the Society. It was decided to have H. M. Goldman, 2nd Vice President and chairman of the Membership Committee handle this affair with the fine cooperation of the members of our Branch.

A letter from W. L. Pinner, 1st Vice President A.E.S., containing a list of speakers available for Open Meetings and Technical Sessions was turned over to our Librarian F. B. Gotthardt.

Applications for Membership

None.

Balloting for Membership

Hugh I. Morris, 105 King St., Bridgeport, Conn., Associate Member.

Alexander Hershey, 386 Iranistan Ave., Bridgeport 4, Conn., Active Member.

Roger G. Parker, 975 Lindley St., Bridgeport, Conn., Associate Member.

Thomas Barnes, 230 Stratford Ave., Bridgeport 1, Conn., Associate Member.

Unfinished Business

None.

New Business

No comments.

Bills against the Branch were ordered paid.

Good of the Order

At this phase of the meeting, C. C. Helmle, one of our very good members, gave a talk about the necessity of having good papers from the members of our Branch containing useful information and data pertaining to the finishing industry. He said that such papers should be read and discussed at our meetings with the view that all approved papers were to be submitted to our Editor with the probability of having them published in our *Review*. Such papers would be interesting, educational and a credit to our Branch.

The treasurer's report was read and accepted.

Vice President Herman C. Braun turned the meeting over to Librarian F. B. Gotthardt. He called upon member V. Consalvo who spoke on "Training of the Novice in the Plating Room." In this paper, Consalvo stressed the importance of instructing, training and advising the new operator in a concise and methodical manner. A discussion followed this fine talk which proved interesting to all of the members present.

After the meeting refreshments were served which were enjoyed by all of the members present.

Meeting adjourned at 11:00 P.M.

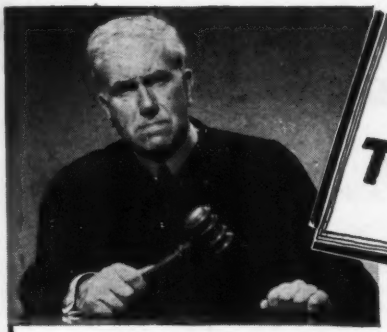
An Open Meeting and Educational Session was held Friday, October 20, 1944 at 8:00 P.M. at the Hotel Barnum. President A. R. McNeil opened the meeting and called upon Librarian Fred Gotthardt to preside as Technical Chairman with 43 members and guests present. After a few introductory remarks Fred called upon Mr. Fritz Uhlenhaut as the speaker.

The subject was "Infra Red—A New Industrial Tool" and Mr. Uhlenhaut, a graduate of Mechanical Engineering from Yale University has had a varied experience in the application and marketing of the Near Infra Red Process throughout the United States. Since the first of the year, he has confined his activities to the Connecticut industry only.

During the discussions, many questions were asked which were nicely explained by Mr. Uhlenhaut, who knows the Infra Red business very well as gathered from his talk. A rising vote of thanks was tendered Mr. Uhlenhaut by all the members and guests present.

Meeting adjourned at 11:05 P.M.

J. G. STERLING, *Secretary and Treasurer*



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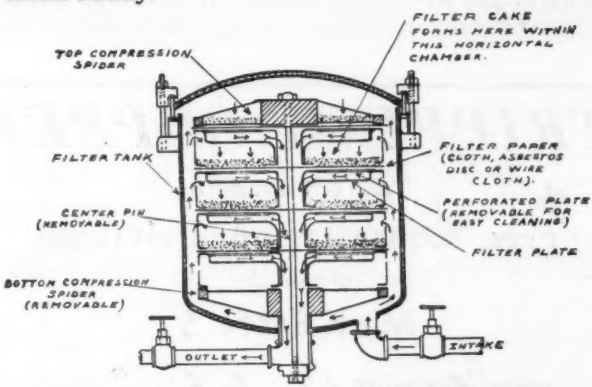

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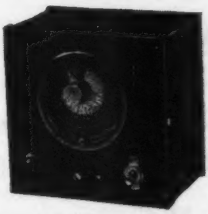

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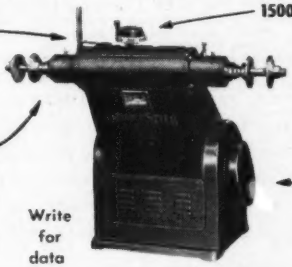

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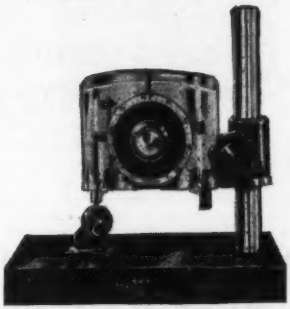

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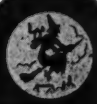

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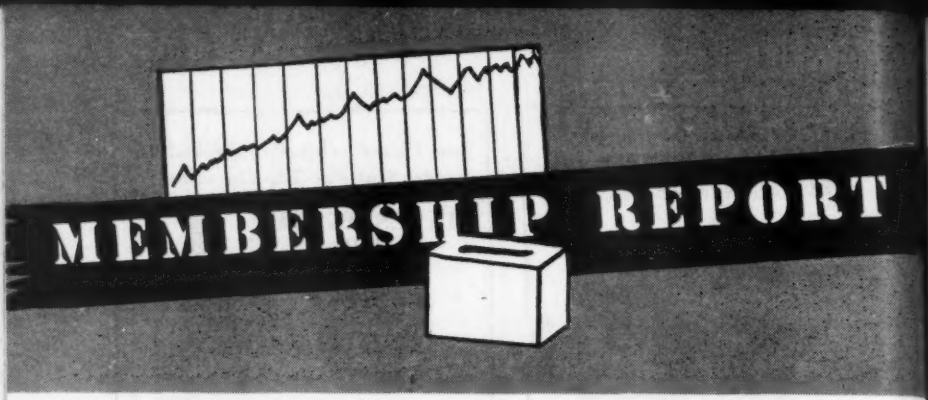

FRANK K. SAVAGE
Chairman, Membership Committee

ELECTIONS

Boston Branch

Anthony Sgro, 236 Paris Street, East Boston, Mass., Active
Frank Lorcesso, 809 Franklin Street, Worcester, Mass., Associate
Robert Blair, 27 Faulkner Street, Malden, Mass., Associate
John S. Antonuccio, 236 Paris Street, East Boston, Mass., Active

Chicago Branch

M. J. Zunick, 2012 Jackson Blvd., Chicago 12, Ill., Associate
G. E. Malohn, 629 North Spring Street, Elgin, Ill., Active
C. E. Fowler, c/o SerVrite Co., Bloomington, Ill., Active
T. G. Swanson, 326 Dwight Street, Elgin, Ill., Active
W. J. Nako, 7539 Fullerton, Elmwood Park 35, Ill., Active
J. M. Andrus, c/o Crow Name Plate, 3701 Ravenswood Ave., Chicago 13, Ill., Active
E. A. Anderson, Revere Copper & Brass, 220 North Natchez Ave., Chicago, Ill., Active
C. L. Lever, 5 North Wabash Ave., Chicago 2, Ill., Active

Dayton Branch

Charles A. Mitchell, c/o Mitchell Engineering Co., Springfield, O., Associate

Detroit Branch

Alexander Lake, 8303 Bryden, Detroit 4, Mich., Active
James McMillion, Jr., 4149 Mildred, Wayne, Mich., Active
William G. Mowbray, 12721 Cloverlawn, Detroit 4, Mich., Associate
Daniel Orcutt, 244 Cedar Street, Wyandotte, Mich., Associate
Shirley Pierce, Box 1881, Detroit 31, Mich., Associate
Irwin Tilton, 18982 Westmoreland Road, Detroit 19, Mich., Active
Harry Zimmerman, 2005 Green Street, Detroit 9, Mich., Active
Franklin K. Clifford, Associate
S. Howard Alleton, 641 North Water Street, Owosso, Mich., Associate
Jacob Beers, 19315 Coventry Street, Detroit, Mich., Active
Louis C. Dell, 637 Northwest Fifth Street, Miami, Fla., Active
William Foley, c/o United Chromium, Inc., 2751 E. Jefferson, Detroit, Mich., Associate
Isadore Goodman, 3515 Sherbourne Rd., Detroit 21, Mich., Associate
Carl MacPherson, Jr., 9260 McKinney, Detroit 34, Mich., Associate
L. C. Surato, 1402 Highland Street, Lansing 6, Mich., Associate
James Buckholder, 2348 Fullerton, Detroit 6, Mich., Associate
Raymond Budnik, 15355 Hazelton, Detroit 23, Mich., Active
Edward Finnie, 924 Hilldale, Royal Oak, Mich., Active

John Harmon, 1259 S. Liddisdale, Detroit, Mich., Associate
G. Gardner Foulke, Garfield Div., Houdaille-Hershey Co., Decatur, Ill., Active
Isreal Gouin, Plant 8, Pontiac Motors, Pontiac, Mich., Active
E. T. Haber, Lennox Furnace Co., Lima, O., Associate

Indianapolis Branch

George S. Morrison, Indianapolis A. C., Indianapolis, Ind., Associate
Robert W. Lancing, 110 E. Christy Street, Marion, Ind., Associate

Lancaster Branch

Harry Brenner, 717 East Chestnut Street, Lancaster, Pa., Active

Los Angeles Branch

Charles Wirth, 240 West Elm Avenue, Burbank, Calif., Active
Bennie Taylor, 530 West Sixth, Los Angeles, Calif., Associate
John Mader, 7046 Hollywood Blvd., Hollywood, Calif., Associate
Carl Klinefelter, 111 South Manhattan Place, Los Angeles, Calif., Active

Milwaukee Branch

Silas W. Koeser, Jr., Bay Plating Co., 220 Cedar Street, Green Bay, Wis., Active
George A. Krause, 1931 Winnabago St., La Crosse, Wis., Active

New Haven Branch

C. Fred Gurnham, Whitney Blade Co., Hamden, Conn., Active

Pittsburgh Branch

W. K. Walker, 950 Fourth Ave., Apt. 6, Coraopolis, Pa., Associate
J. M. Blazier, 530 Byran Ave., Baden, Pa., Associate
Herbert Patterson, R.D. 3, Coraopolis, Pa., Associate
Dennis R. Turner, Research Lab., Westinghouse Electric Co., E. Pittsburgh, Pa., Associate
Lawrence J. Durney, Sulphur Products Co., Greensburg, Pa., Active

Providence-Attleboro Branch

O. Edmund Cameron, Sr., 34 Wall Street, Attleboro, Mass., Active
Honorious Lefebvre, 3 Elbow Street, Attleboro, Mass., Active
George J. Lederer, Providence Stock Co., Providence, R. I., Active
Roger Lincoln, 88 Hawthorne Ave., Cranston 10, R. I., Associate
Elie Bessette, 222 Richmond Street, Providence, R. I., Active
Edwin Sjoquist, 332 Aquiduct Road, Cranston 10, R. I., Active
Oscar Rabe, 75 Lexington Ave., Providence, R. I., Active
Louis A. Luther, B. A. Ballou, Inc., 61 Peck St., Providence, R. I., Active
Edwin Spiedel, 70 Ship Street, Providence, R. I., Associate

Springfield Branch

Daniel J. Cline, 30 Belmont Ave., Springfield, Mass., Associate
William Pyne, 349 King St., Springfield, Mass., Associate
Raymond P. Senecal, 208 Porter Road, E. Longmeadow, Mass., Associate

Toledo Branch

Glenn Noe, R.F.D. 3, Ada, O., Associate
James McKaig, R. 9, Box 700, Toledo, O., Active
William Fair, Vic Miner Co., Toledo, O., Associate
Jess L. Manges, 140 Railroad St., Bluffton, O., Active
Clion A. Triplett, 329 S. Main, Bluffton, O., Associate
Ronald Bechtel, Vic Miner Company, 329 20th St., Toledo, O., Associate

Toronto Branch

Miller Anderson, 21 Grove Ave., Toronto, Canada, Active
L. S. Williams, 107 Indian Road, Crescent, Toronto, Canada, Associate

APPLICATIONS

Baltimore-Washington Branch

Charles W. Ostrander, 3002 Ferndale Ave., Baltimore, Md., Active
Arthur J. Connor, 2519 Pennsylvania Ave., Baltimore, Md., Associate

Jules Horlick, 2523 Pennsylvania Ave., Baltimore, Md., Associate
George Milo Keller, 650 E. Capitol Street, Washington, D. C., Associate
Harry S. Felton, 5922 Sefton Ave., Baltimore 14, Md., Associate

Bridgeport Branch

Harry Davidoff, General Electroplating Co., Stamford, Conn., Associate

Chicago Branch

J. P. Koley, 2512 Farnam Street, Omaha, Neb., Active
H. M. Clain, 3740 North Harding, Chicago, Ill., Active
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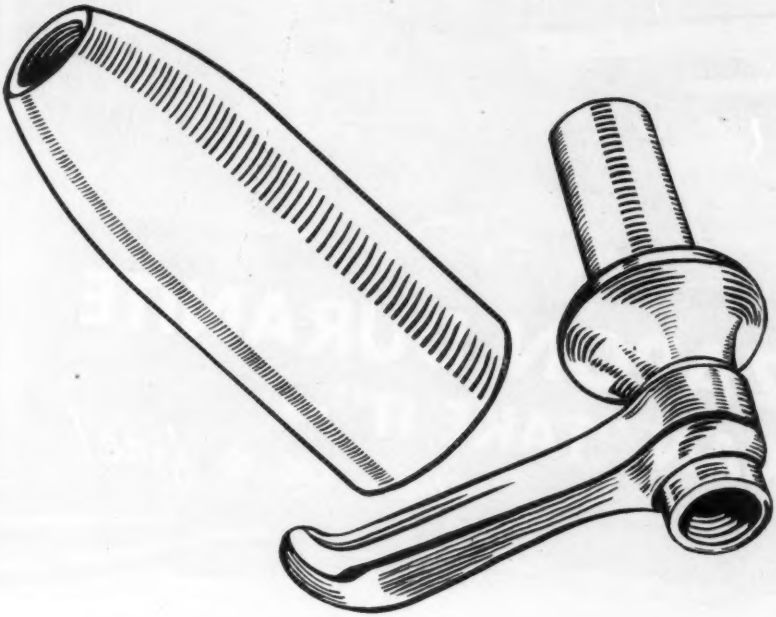
MEMBERSHIP CHART

BRANCH	May 1944	Change in Membership	Percent Change
FIRST GROUP			
LOS ANGELES	123	+17½	+14.2
CLEVELAND	115	+13	+11.3
DETROIT	336	+33	+ 9.8
NEW YORK	158	+12½	+ 7.9
CHICAGO	323	+25	+ 7.7
BOSTON	130	+ 8	+ 6.1
WATERBURY	111	+ 6½	+ 5.8
PHILADELPHIA	138	+ 7	+ 5.
HARTFORD	114	+ 5	+ 4.3
NEWARK	198	+ 6	+ 3.
ST. LOUIS	111	—	—
SECOND GROUP			
TORONTO	109	+ 9	+ 8.2
DAYTON	100	+ 8	+ 8.
BALTIMORE-WASH.	107	+ 8	+ 7.4
NEW HAVEN	95	+ 7	+ 7.3
GRAND RAPIDS	109	+ 6½	+ 5.9
BRIDGEPORT	102	+ 6	+ 5.8
SPRINGFIELD	79	+ 3	+ 3.2
BUFFALO	80	+ 2	+ 1.2
ROCHESTER	83	+ 1	+ 1.2
MILWAUKEE	97	—	—
THIRD GROUP			
INDIANAPOLIS	74	+23	+32.4
PROV.-ATTLEBORO	66	+18	+27.2
SYRACUSE	51	+12½	+24.5
JACKSON-LANSING	51	+11	+21.5
TOLEDO	42	+ 6	+14.2
PITTSBURGH	68	+ 4½	+ 6.6
LANCASTER	40	+ 2½	+ 6.2
CINCINNATI	63	+ 2	+ 3.1
SAN FRANCISCO	39	+ 1	+ 2.5
AUSTRALIA	51	—	—
MONTREAL	50	—	—
ANDERSON	23	— 2	— 8.6

Membership May 1, 1944 = 3385 | Gain in Membership = 262½
Membership Dec. 1, 1944 = 3647½ | Per Cent of Gain 7.7%



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● Wyandotte metal cleaners take jobs as they come. They're bringing speed and economy to all sorts of metal-cleaning operations in all kinds of industries because they're experts at making metal surfaces *right* for the next process.

● There is a Wyandotte product for every metal-cleaning need — for cleaning after machining and prior to plating, painting, lacquering, blackening, anodizing or spot welding. And the Wyandotte Field Engineer will help you apply them to your particular operation.

● You can have his specialized help, too, in devising new cleaning methods for new processes. You'll find his advice especially valuable in these days of change-overs and new materials. Get in touch with the Wyandotte Field Engineer today.

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When we say Zapon Duranite can really "take it" we have the proof. Here it is: Infra-Red DeVices, Inc., use Duranite exclusively on both Hot Cathode and Cold Cathode fluorescent fixtures. Some time ago this company installed a number of Duranite finished fixtures in a large industrial factory. Following a fire, some 10,000 lighting fixtures had to be cleaned. . . . ***Those finished with Duranite cleaned like new.***

Fire, water, chemicals and smoke had absolutely no effect on the Duranite reflecting surface. But that's not all. A number of similar fixtures which were not finished with Duranite could not be satisfactorily cleaned for re-use.

Result: The factory has informed Infra-Red DeVices, Inc., they are in the market for more fixtures, *finished with Duranite.*

This is only one of the case histories proving that Duranite is a better finish for a better job. We'll be glad to tell you in detail just how Zapon Duranite can help solve your metal finishing problems. Why not drop us a line today on your business letterhead?

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Zapon Duranites, like all Zapon finishes, are scientifically tested in our laboratories before use. They must not only stand up under the most exacting conditions they will encounter in use, but must *prove* that their resistance to all re-agents is far beyond any demands likely to be made. We'll be happy to give you the facts and figures.

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WALTER PINNER

Chairman, Program and Educational Committee

A New Development in the Electrodeposition of Brass. By JOHN KRONSBEIN and ALAN SMART. J. Electrodepos. Tech. Soc. 1944, 19, 107-122.

A rather complete description is given of a full automatic installation developed for high-speed plating of .0003" of 70-30 brass on the external surface of steel cartridge cases of artillery size.

The machine developed is unique, as is also the high-speed brass plating solution. Plating conditions used are as follows:

Solutions

Zinc	30 g./L.
Copper	15 g./L.
Sodium Carbonate	20 g./L.
Free Cyanide	4 to 8 g./L.
pH (Tropaeolin "O")	12.6 to 12.8
Ammonia added	None
Anodes	70-30 brass
Temperature	131-140° F.
Agitation	Slow-moving conveyor only
Cathode Current Density	20 amps. per Sq. Ft.
Cathode Current Efficiency	55 to 60%
Rate of Deposition	Approx. .001" per hr.

L. B. SPERRY

Chromium Plating of Dies and Tools. By DR. D. A. COTTON. *Metal Finishing*, June 1943, Vol. 41, No. 6.

This article gives a short history of chromium plating up to the present and covers the procedure of hard chromium plating of drills, taps, reamers, plastic moulds, gages, and the plating to dimension of worn dies or dies that have been machined undersize.

The most significant application of this procedure is the usage of current density up to 4,000 amps./sq. ft. depending upon the object being plated. The bath used is one containing 40-45 oz./gal. of CrO_3 and .55-.65 oz./gal. of sulphate (a ratio of approximately 70 to 1) and operated at a temperature of 135°-140° F.

It has been the experience of Dr. Cotton that burnt plate or peeling may occur, if the CrO_3 drops below 40 oz./gal., and that a low SO_4 may result in a grey deposit, which he does not believe to be hard chromium.

Comparatively new ideas are suggested and illustrated in regard to auxiliary anodes, which are termed latticed anodes. These anodes are fabricated from lead or solder wire of various diameters, as compared to the shaped anodes from sheet lead. Better conditions, as to the replacement of fresh solution within the part being plated; withdrawal of hydrogen gas bubbles; and more uniform current dis-

tribution is obtained with these latticed anodes. Due to chemical constituents of material, some can be plated faster than others and for this same reason, the initial current density must be varied, depending upon the object being plated.

On the whole, this is a very comprehensive article on hard chromium plating, with many suggestions on practical application.

HARRY D. BURGESS

Counter Current on Zinc Anodes. By R. O. HULL, *Metal Finishing*, Sept. 1944, pp. 545-546.

The idea of using a small counter current applied between a zinc anode (as cathode) and a steel sheet in a zinc plating bath (as anode), to maintain zinc metal within the limiting range of concentration for proper operation, is believed to be novel.

As little as 0.15 amperes per square foot of anode area reduces chemical attact by about 90%, and 0.20 amperes per square foot eliminates any zinc passing into solution. More than two (2) volts is not desirable, because zinc will then be slowly plated on the zinc anodes. A total current of 1¼ amperes on a 1000 gallon still tank is sufficient—2½ amperes on a 1000 gallon barrel tank with more anodes.

A light gauge steel sheet, having at least one-half of the zinc anode area, is preferred. Alternatively, the plating tank itself, if zinc plate free steel, may be used.

A counter current in no way affects the desirability of using special alloy zinc anodes and may be used where steel anode baskets are used. Such a current is reported to be beneficial in controlling anode sludge.

R. B. KINNAMAN

Determining Thickness of Electro Deposited Tin Coatings. *Iron Ave.* Vol. 153, No. 17. April 27, 1944.

An improved method of determination of local thickness of electro deposited tin coating is claimed by the Russians. This drop test stripping method is similar to that used for zinc and other metals. The article is tilted at 45° and checked for time intervals required to expose base metal.

The solution composition is 130 cc. nitric acid, 50 cc. hydro chloric acid, and 27 grams of ferric sulphate diluted to make one litre of solution. The dropping rate of 120 drops per minute is applicable for coatings between .003 and .001 inches thickness.

This test is not affected by differences in composition of the tin plating solution or the base metal used. The time stripping varies with the temperature of the solution:

At 59° F., time 12½ seconds for .001 inches.
At 72° F., time 9-8/10 seconds.
At 88° F., time 8½ seconds.
At 100° F., time 6-8/10 seconds.

C. W. SMITH

Zinc Plating of Large Aircraft Structures. By MANUEL SANZ, *Iron Age*, Vol. 153 #24, June 15, 1944, page 64.

The equipment and technique employed in zinc plating of large and complex aircraft structures is described.

Cleaning and passivating practices, together with data on change over from cadmium to zinc are given in detail.

C. W. SMITH

Standard Costing of Plating Processes. By R. W. HARRISON. *Journal of the Electrodepositors' Technical Society* **1944, 19,** 91-105.

The necessity for cost analysis in the plating and polishing rooms is emphasized; cost breakdown for plating is detailed and illustrated.

L. B. SPERRY

BOOK REVIEWS

DR. GEORGE DUBPERNELL

How to Understand Electricity. A. Frederick Collins. Revised Edition, 326 pages. The New Home Library—The Blakiston Co., Philadelphia, Pennsylvania, 1944. Price 69c.

While this book is very low-priced and is available in most five and ten cent stores and chain stores, as well as book stores, it should not be overlooked as being too elementary for those already having some knowledge of the subject. The author states that his aim is to take you "———— as far as you would get if you studied college physics." The reviewer is not competent to judge whether or not this aim has been achieved, but it would seem to be a reasonably accurate claim to make for the book, if not a modest one.

The remarkable amount of ground covered will be evident from the chapter headings, which run as follows: How Magnetism and Electricity Got Their Names, Magnetism and Magnetic Effects, Magnetic Induction, Permeability and Diamagnetism, What Electricity Is, Static Electricity or Electrostatics, Current Electricity or Electrodynamics, Electromotive Force, Current and Resistance, Kinds of Primary Battery Cells, Kinds of Storage Battery Cells, How Battery Cells are Connected Up, About the Electric Circuit, The Energy of the Current, The Heating Effects of the Current, Heat Electricity or Thermoelectrics, Chemical Electricity, or Electrochemistry, Electroplating, Electrotyping and Electrometallurgy, The Magnetic Effects of the Current, More Electromagnetic Effects of the Current, Some Uses of Electromagnetism, What Electromagnetic Induction Is, Some Electromagnetic Induction Effects, Some Uses of Electromagnetic Induction, The Direct Current Dynamo, The Direct Current Motor, About Alternating Current, The Alternating Current Generator, The Alternating Current Motor, The Alternating Current Transformer, About the Electric Discharge, How to Make Electrical Measurements, What Electrostatic and Electromagnetic Units Are.

The discussion of each of the above subjects seem adequate for a clear understanding and beginning familiarity, and no tendency to a superficial treatment was noted, such as might be expected in a low priced, popularized book. There are 158 illustrations which help a great deal, and a good index. No previous technical knowledge is expected of the reader in order that he may study the book. The author does not appear to avoid the use of mathematics at all, but every formula is completely labeled or stated or explained in words, so that nothing is hidden from the lay reader at any point by concealment in a mathematical equation. For example, Ohm's law is not $I = \frac{E}{R}$ but amperes equals volts divided by ohms, or current in amperes equals electromotive force in volts divided by resistance in ohms. Every formula is either labeled with the words it represents or else explained completely.

The theory of electricity given is modern throughout. "An electric current is simply electrons in orderly motion, whether through a wire, through the air, or in a vacuum tube." Older textbooks generally consider that current flows from positive to negative or from anode to cathode — a flow of "positive" electricity. Time has shown this to be wrong, and that what actually happens is a flow of

negative electricity or electrons in the opposite direction, or from cathode to anode. This is apt to be confusing to many of us used to thinking in terms of electricity flowing from anode to cathode, but should be overlooked as it is of no practical importance as long as we stick to a single way of thinking in connection with a given problem. The diagrams in the book under review all show the current flowing from cathode to anode, but we should keep in mind that this is a current of negative electrons, and means the same thing as the older notion of a positive current from anode to cathode.

No specific problems are given in the book to aid the reader in self study. The author expects the reader to be able to apply the knowledge gained to the solution of his own problems. In order to really understand the fundamentals of electricity the reader is expected to make the experiments that are given in connection with the descriptions of varied phenomena. "When you have conscientiously done these things, electricity and the way it works will no longer be a mystery to you but almost as tangible a thing as is gross matter itself."

The writer of this book is stated to be the inventor of the wireless telephone and the author of 26 other books of popular appeal of which a list is given. One wonders if these other books make any approach to the very high standard of this present one on electricity. It would hardly seem possible for a single author to give such a clear and detailed exposition of the subject in other fields as is given here.

Commercial Methods of Analysis. Snell and Biffen, 753 pages, McGraw-Hill Book Co., New York 1944. Price $6.00.

"Commercial Methods of Analysis" will be a welcome addition to the library of many electroplaters, particularly those, who, in addition to their duties as electrochemical engineers, are in charge of the analytical laboratory and responsible for the analysis of any new and strange concoction that may put in its appearance, be it via the mails or over the plant manager's desk.

This book is a healthy change from the many analytical textbooks which are available. As a matter of fact I believe the authors would not claim the book to be a text. It is rather a collection of practical methods edited in a understandable form for the direction of the analyst, including in addition reasons for the operations involved and valuable descriptive materials covering each class of material.

Subjects of interest covered include: a system of qualitative analysis by micro and spot tests, the analysis of minerals, water, ferrous metals, aluminum and aluminum alloys, copper alloys, fats and oils, soaps, lubricating greases, solvents, paints, varnishes, lacquers, coal, gas, and petroleum products.

The above list does not include all the subjects covered, only those which might be of interest to the electroplater in charge of a laboratory. It is suggested that anyone concerned with various analyses, particularly if this type of analysis is carried out infrequently, examine "Commercial Methods of Analysis."

D. GARDNER FOULKE

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"I hear the war's practically over... back home!"

PROBABLY it's only natural for us here at home to feel that the war's almost won, the way the good news has been pouring in.

But the war's not over for *him—not by a long sight!* And he's just one of a few million or more that will stay over there until they finish the bloody mess. Or kill time for a few months—or years—in some hospital.

What about *you?*

This is no time to relax. No time to forget the unfinished business. It's *still* your war, and it *still* costs a lot.

So dig down deep this time. Dig down till it hurts, and get yourself a hundred-dollar War Bond over and above any you now own—or are now purchasing. This 6th War Loan is every bit as important to our complete and final Victory as was the first.

Don't "let George do it"—get *yourself* that *added* bond for the sake of the guys that can *still* be killed. After all, you're safe and sound and *home. That's worth another hundred-dollar bond, isn't it?*

Buy at least one extra $100 War Bond today!

6 WAR LOAN

The **MONTHLY REVIEW**

This is an official U. S. Treasury advertisement—prepared under auspices of Treasury Department and War Advertising Council.

Address requests for patents to the Commission of Patents, Washington, D. C.

HENRY STROW

October 12, 1944

#2,360,509—Pickling solvent by John D. Morgan and Russell E. Lowe assigned to Cities Service Oil Co. A composition for removing rust and oxide scale from metal objects comprising from 7 to 10 parts of phosphoric acid, 3 to 5 parts of an alkali metal bisulfate, 5 to 7 parts of an alkali metal acid phosphate from 0.1 to 0.5 part of a mineral oil sulfonate and eighty — 100 parts of water, all parts by weight.

October 24, 1944

#2,361,013—Electrolytic Refining of copper bearing materials by Sidney A. Corren assigned to Nassau Smelting & Refining Co. Process of refining lead bearing copper in an electrolytic cell containing 100 to 200 grams per liter of free sulfuric acid and also containing sufficient sulfonic acids to inhibit polarization of the anodes.

#2,361,143—Manganese deposition control by Karl M. Leute, C. L. Mantell and W. L. Hammerquist assigned to Electro Manganese Corp. Process of electrowinning of manganese with means provided for continuous interchange of anolyte and catholyte proportional to current maintaining concentrations of solutions.

October 31, 1944

#2,361,720—Nickel Electroplating Bath by William P. Ter Horst assigned to U. S. Rubber Company. A bath for electrodeposition of nickel consisting of a solution of nickel chloride or nickel sulfate and also a brightening agent consisting of a pyrimidine compound as produced by reacting substituted 2-mercapto dihydropyrimidines with concentrated sulfuric acid and heating until evolution of sulfur dioxide has ceased.

November 7, 1944

#2,361,962—Method of Metal Clading by Bela Ronay. A method of spraying metal on a surface painting on a suitable deoxidized preheating the entire combination and progressively remelting the coating by means of applied heat sufficiently concentrated to fuze the coating to the surface of the metal without dwelling long enough in one place to cause a metallurgical change in the basis metal or a change in thickness or contour of the coating.

#2,362,155—Tumbling apparatus for degreasers by Willard D. Phillips and Ralph A. Van Fassen. A tumbling cylinder for use in a degreasing machine arranged to roll on inclined rails into and out of the machine giving a tumbling action when entering and leaving the degreasing machine.

#2,362,284—Metal cleaning compositions by Louis MacDonald. A metal cleaning composition for the removal of tarnish, oxide and scale, consisting of Bentonite 10 to 30 parts, Glucono delta lactone 10 to 20 parts, wetting agent about 2 parts with tripoli and infusorial earth to make up 100 parts.

BRANCH DIRECTORY

ANDERSON meets second Tuesday of every month at 7:30 p.m., at the Y. M. C. A., Anderson, Indiana. Secretary-Treasurer, E. L. McKinney, 2014 Fairview St., Anderson, Ind.

AUSTRALIA. Secretary-Treasurer, Lawrence Smith, Box 2064, G.P.O., Sydney, Australia.

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BUFFALO meets second Friday of each month at Hotel Statler, Buffalo, N. Y. Secretary J. C. Mays, 9436 W. Rivershore Dr., Niagara Falls, N. Y.

CHICAGO meets second Friday of each month at 8 p.m., Atlantic Hotel, 316 S. Clark St. Secretary, M. H. Longfield, 1528 South 61 St., Cicero 50, Ill.

CINCINNATI meets on fourth Thursday of each month at 8 p.m., at the Engineering Society Headquarters, McMillan St. and Woodburn Avenue, Cincinnati, Ohio. Secretary-Treasurer, Elliott W. Horning, 2425 Kenilworth Ave., Norwood 12, Ohio.

CLEVELAND meets first Saturday of each month at Cleveland Hotel. Secretary-Treasurer, Harvey P. Heil, 12901 Elmwood Ave., Cleveland 11, Ohio.

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HARTFORD meets third Monday of each month alternately at Hartford Electric Light Company, Hartford and at the Elks Club, corner South and Main Sts., Bristol, Conn. Special meetings are held at the New Britain Trade School, New Britain, Conn. Secretary, F. W. Smith, 46 Cottage St., Meriden, Conn.

INDIANAPOLIS meets at the Hotel Riley, the first Wednesday of each month. Secretary-Treasurer, Carl B. Morris, 1828 N. Pennsylvania, Indianapolis, Ind.

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LANCASTER meets second Friday of each month at 8 p.m., at Thaddeus Stevens Industrial School, Lancaster, Pa. Secretary-Treasurer, W. H. Fordney, 603 Marietta Ave., Lancaster, Pa.

LOS ANGELES meets the second Monday of each month, 6:30 p.m. at the Rosslyn Hotel, corner Fifth and Main Sts. Secretary-Treasurer, Frank Bunker, 2030 Bay St., Los Angeles, Calif.

MILWAUKEE meets first Friday of each month at Republican Hotel. Secretary-Treasurer, James Durnford, 2370 N. 32nd St., Milwaukee 10, Wis.

MONTREAL meets first Monday of each month at Mount Royal Hotel, Montreal, Quebec, Canada. Secretary-Treasurer, W. G. Finlay, 5670 16th Ave., Rosemount, Montreal.

NEWARK meets first and third Friday of each month at Hotel Robert Treat, Newark, N. J., at 8 p.m. Secretary-Treasurer, George Wagner, 1130 So. Long Ave., Hillside, N. J.

NEW HAVEN meets the first Tuesday of each month at Sterling Chemistry Laboratory, Yale University. Secretary-Treasurer, B. J. Gaffney, 40 Filbert St., Spring Glen, Hamden 14, Conn.

NEW YORK meets second and fourth Fridays of each month, in the Hotel Pennsylvania, 7th Ave. and 33rd St., New York City, N. Y. Secretary-Treasurer, Franklyn MacStoker, 25 Princeton St., Garden City, L. I., N. Y.

PHILADELPHIA meets fourth Friday of each month, in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, Paul Mentzer, Sr., 7242 Bingham St., Philadelphia 11, Pa.

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ROCHESTER meets third Friday of each month at the Hotel Seneca, Rochester, N. Y. Secretary-Treasurer, Donald C. Blum, 672 Mt. Read Blvd., Rochester, N. Y.

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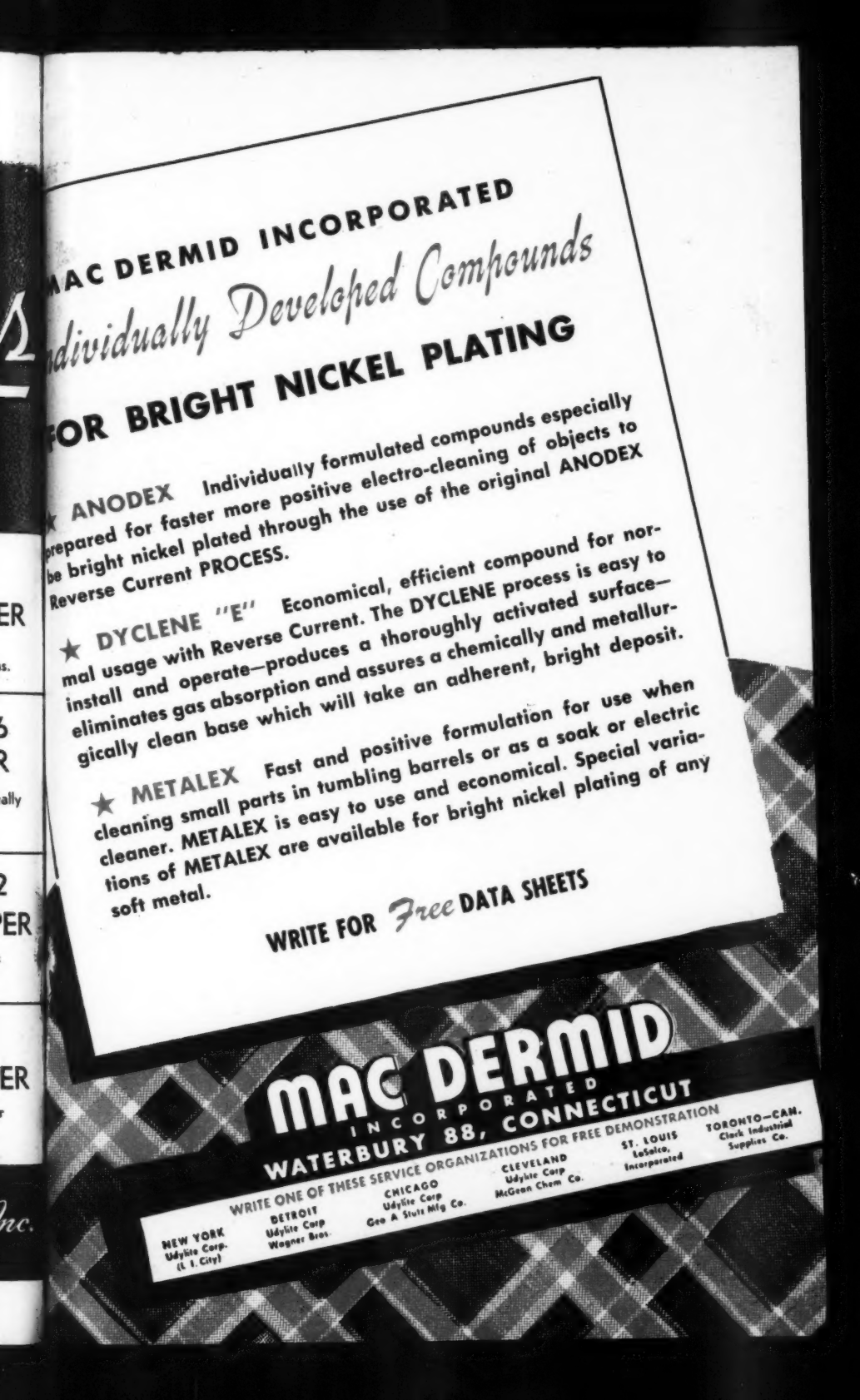
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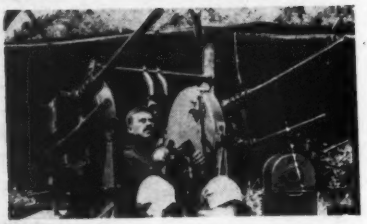

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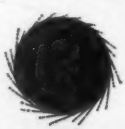

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